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Andrew Wendell
Senior Chemist and QA/QC Officer
Newport, Maine

In Control

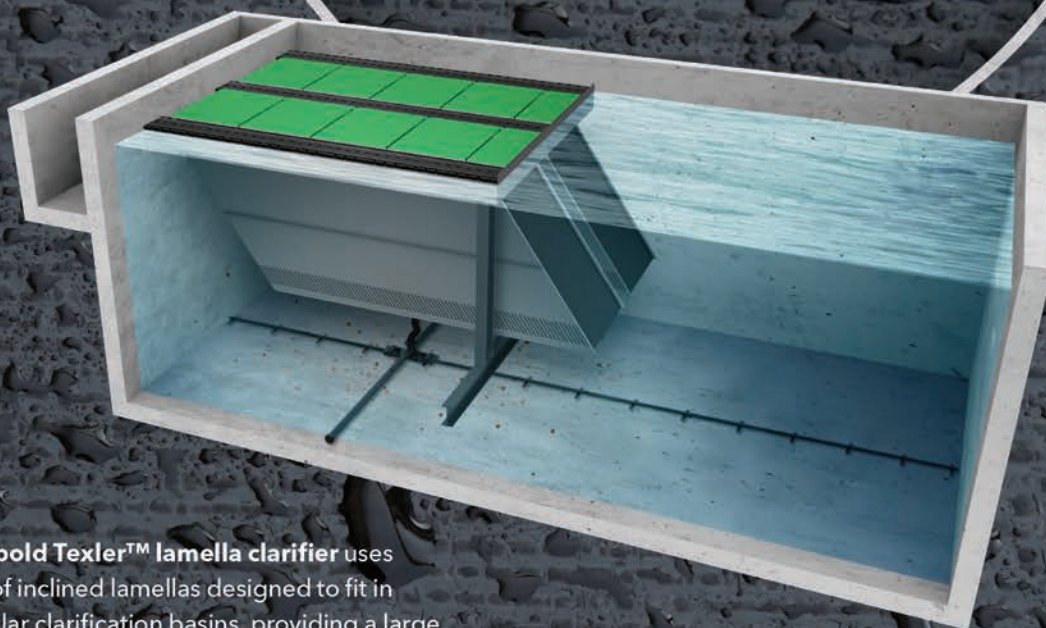
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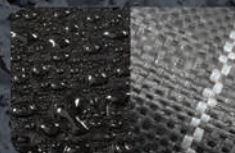
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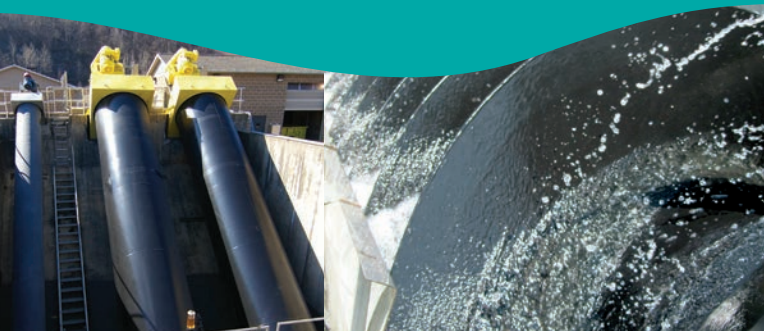
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ON THE COVER: Andrew Wendell loves to keep track of data. As senior chemist and quality assurance/quality control officer at ClearWater Laboratory in Newport, Maine, he does so with rigor; that's what confers credibility with regulators and treatment facility operators. (Photography by Gabe Souza) **cover story**
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let's be clear

What I Learned in Diversity Training

AS THE WEF MAKES A PRIORITY OF DIVERSITY, EQUITY AND INCLUSION, IT'S WORTHWHILE TO REFLECT DEEPLY ON MATTERS OF RACE AT WORK AND IN THE COMMUNITY

By Ted J. Rulseh, Editor



“Why are they so angry?”

That was my first thought while taking part in a two-day corporate diversity workshop at the electric utility where I worked in the early 1990s.

When I learned about the small-group workshops, which were mandatory, I signed up right away and became a member of the first group, about evenly split between white people (like me) and people of color, mostly African Americans.

I offer these memories and takeaways from my experience in light of WEF's Diversity, Equity and Inclusion initiative, which celebrates “our unique differences including education, career background, age, gender, race, ethnicity, nationality, gender identity” and much more.

RAW EMOTION

I didn't know what to expect in the workshop. I had a vague idea that somehow we'd be broken into mixed-race groups and asked to solve problems and break down barriers of ethnicity and skin color and learn to work together.

I encountered something far different. In the various sessions the white people in the group were confronted by questions with a strong accusatory tone, and with a list of grievances. From a Black man: “How do you think I feel when a white woman sees me coming on the sidewalk and clutches her purse, or crosses the street to avoid me?”

From a Black woman: “Have you ever had a salesperson follow you around a store and watch you while you're shopping?”

From a Black man: “Why do white people always ask me about last night's basketball game — as if they assume I must have watched it?”

EVOLVING RESPONSES

My first reaction was to feel hurt, and then a little angry, at the vitriol coming my way. I didn't think of myself as racist; my family life and religious grade school education had taught me about bigotry and racial justice.

But then I had to ask myself: How eager would I be to get out of a car in the middle of a Black neighborhood in a big city? Hadn't I once worked for a company where my boss would not consider hiring a Black account executive — because our clients would not accept them? Don't I have a biracial nephew who has been called the N-word by one of his neighbors?

Toward the end of the session came a question to the white people from a Black man, named Jerome, that I can still actually hear in memory: “Will you admit that you have white skin privilege that gives you advantages in life?”



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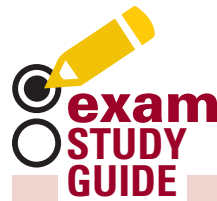




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WASTEWATER

By Rick Lallish

What term is defined as a measurement of how much acid can be added to water before there is a big change in pH?

- A. Conductivity
- B. Turbidity
- C. Acidity
- D. Alkalinity

ANSWER: D. Alkalinity is discussed in aerobic and anaerobic digestion. Biological treatment works best when the pH is maintained in the 6.5 to 9.0 range and there is enough residual alkalinity to keep it there. Alkalinity is expressed as mg/L as CaCO_3 . Understanding some chemistry in aerobic and anaerobic digestion and the wastewater process will help in achieving higher certifications. Learn more in the WEF Textbook, *Wastewater Fundamentals II – Solids Handling and Support Systems*, Chapter 3.

DRINKING WATER

By Drew Hoelscher

Which chemical reaction represents the precipitation of noncarbonate hardness?

- A. $\text{CaSO}_4 + \text{Na}_2\text{CO}_3 \rightarrow \text{CaCO}_3\downarrow + \text{Na}_2\text{SO}_4$
- B. $\text{Ca}(\text{HCO}_3)_2 + \text{Ca}(\text{OH})_2 \rightarrow 2\text{CaCO}_3\downarrow + 2\text{H}_2\text{O}$
- C. $\text{Mg}(\text{HCO}_3)_2 + \text{Ca}(\text{OH})_2 \rightarrow \text{CaCO}_3\downarrow + \text{MgCO}_3 + 2\text{H}_2\text{O}$
- D. $\text{MgCO}_3 + \text{Ca}(\text{OH})_2 \rightarrow \text{CaCO}_3\downarrow + \text{Mg}(\text{OH})_2$

ANSWER: A. Carbonate hardness (temporary hardness) and noncarbonate hardness (permanent hardness) contribute to total hardness. To reduce noncarbonate hardness, calcium hydroxide (lime) and sodium carbonate (soda ash) are introduced to the treatment process. This chemical reaction produces an insoluble calcium carbonate precipitate. Sodium hydroxide (caustic soda) could be used in place of calcium hydroxide and sodium carbonate, but the increase in chemical cost usually limits this practice.

ABOUT THE AUTHORS

Rick Lallish is water pollution control program director and Drew Hoelscher is program director of drinking water operations at the Environmental Resources Training Center of Southern Illinois University Edwardsville. tpo

POLITICS ASIDE

Now, I know that the whole concept of white privilege has taken on political overtones — that some say the concept is designed to make white people feel guilty or hate themselves, that its purpose is to divide the country and subjugate white Americans.

But in looking at the concept carefully, one runs into realities that are incontrovertible. For example, a white person likely will never be denied a mortgage or car loan, have an apartment rental application rejected, or be stopped by a police officer while driving in a “wrong” neighborhood solely because of skin color.

How do you think I feel when a white woman sees me coming on the sidewalk and clutches her purse, or crosses the street to avoid me?

BLACK MAN IN DIVERSITY WORKSHOP

on the anger directed toward members of my race. What I decided was that it's not my place to decide whether that anger was justified. It grew out of people's experiences. This is the way they genuinely feel. As we strive toward racial harmony, this is the point from which we begin. tpo

Being aware of this privilege does not make me feel guilty or oppressed. It does make me appreciate the reality that prejudice still exists against people of races different from mine, and it inclines me toward more vigorously supporting policies that promote racial equity and justice — so that in time we all enjoy the same privilege.

ABOUT THE ANGER

After the diversity training the hurt feelings faded, and I reflected

Visit the site daily for new, exclusive content. Read our blogs, find resources and get the most out of *TPO* magazine.



RIDING THE WAVES

Desalination Challenge Continues

Storms and hurricanes create challenges for coastal communities that need reliable access to energy and drinking water. To help them, innovators are tapping into the power of ocean waves. Read about three teams diving into the Waves to Water competition, which seeks to design wave-powered desalination devices for coastal communities.

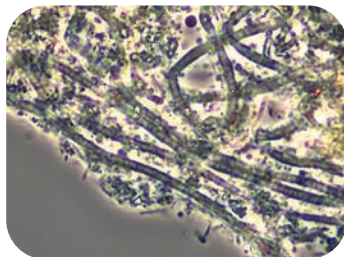
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BUG OF THE MONTH

Filament 0675/0041 and Bulking Events

This month in our online wastewater microbiology spotlight, readers learned about Eickelboom filament types 0675 and 0041 and how they may be associated with bulking events at wastewater treatment plants. The article also offers control strategies for bulking events associated with these filament types.

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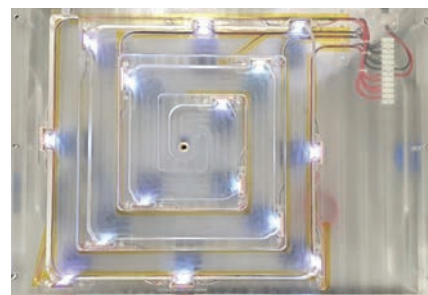
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INSPIRED BY NATURE

Students Develop Treatment System

Students from Monash University Chemical Engineering have used the nature's water treatment cycle as inspiration to develop a sustainable, stand-alone water treatment system that removes persistent organic pollutants from industrial wastewater. The Stand Alone Sunflow System uses easily accessible and affordable materials.

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In Control

DATA DRIVES ANDREW WENDELL IN HIS LEADERSHIP ROLE AT CLEARWATER LABORATORY. IT'S WHAT PROVIDES CREDIBILITY WITH REGULATORS AND TREATMENT FACILITY OPERATORS.

STORY: **Steve Lund**
PHOTOGRAPHY: **Gabe Souza**



“It’s satisfying because of wearing many hats. Every day the job is a little different and a little interesting.”

ANDREW WENDELL

Although not involved in operating treatment plants, Andrew Wendell earned a certification as a wastewater operator early in his career as a way to gain credibility when advising on treatment plant problems.

Andrew Wendell loves to keep track of data. That includes data about his own laboratory. Wendell is the senior chemist and quality assurance/quality control officer for ClearWater Laboratory in Newport, Maine, “One of the things I actually enjoy the most, and one of the things I get the most kudos for from my accreditors, is control charts,” Wendell says.

“It’s my way of tracking data — the quality control data, blanks, duplicates, standards, spikes. I get the most pleasure when I see that the laboratory is in control with the data that we generate on a daily basis.”

For Wendell, in control means the result is within an acceptable statistical range. “It’s a very geeky pleasure to take this data, put it in, and see how it plays out in real time,” he says. “Every day you generate a new data point. Everything to the left is yesterday or last week or last month or last year. You see how good or bad the lab is doing previously.

“To the right, it’s a blank page because you haven’t written the data, so you don’t know yet. Every day, that is the Zen moment: Here is today’s data. If it is in control, that is a good day. My job as a QA officer is to keep it in control.”

ClearWater Laboratory in Newport, Maine



Andrew Wendell,
ClearWater Laboratory
Newport, Maine



POSITION:
**Senior chemist and
quality control/quality
assurance officer**

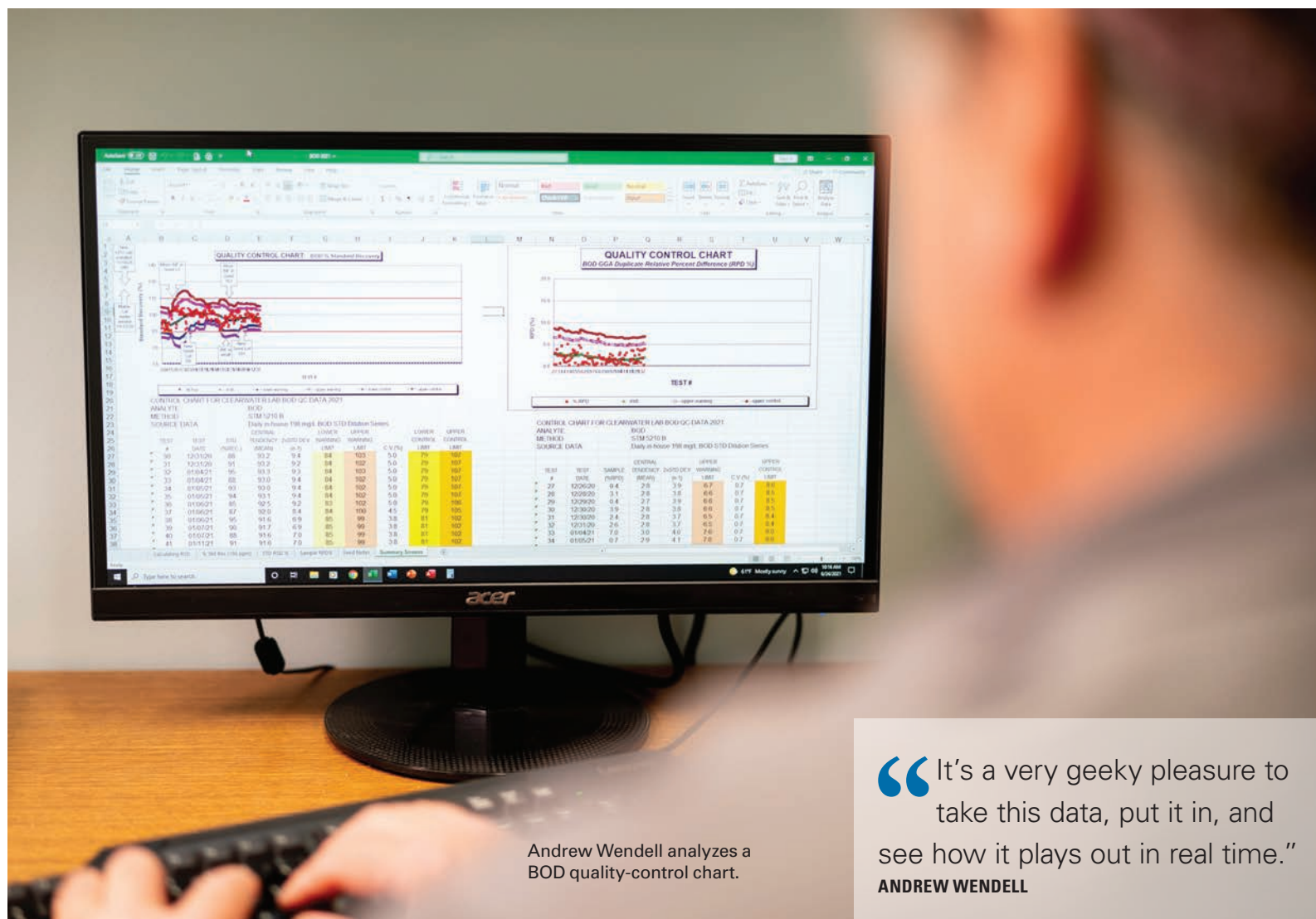
EXPERIENCE:
32 years in the industry

EDUCATION:
**Bachelor’s degree,
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Unity College**

CERTIFICATIONS:
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regulators and regulated
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Andrew Wendell analyzes a BOD quality-control chart.

“It’s a very geeky pleasure to take this data, put it in, and see how it plays out in real time.”
ANDREW WENDELL

His meticulous nature surely helped him on the way to earning the 2020 Laboratory Analyst Excellence Award from the New England Water Environment Association.

AT HOME IN THE LAB

Wendell has always been attracted to laboratories. “I volunteered as a lab assistant when I was in high school,” he says. “Even then I had an affinity for laboratory work.”

He grew up in a Philadelphia suburb but always had a connection to Maine because his family had a vacation home on a pond there. He attributes his early interest in science to his parents. His father was a chemist who became a computer programmer, and his mother was a volunteer ecology teacher.

During high school, while they were on vacation at the camp, his parents took him to visit the University of Maine, where he had an interview. On the way back, his mother asked him if he wanted to also visit Unity College, since it was on the way, and it had an environmental program. Wendell loved it right away.

“There was a large cement block building that was the gym and classrooms,” Wendell recalls. “The dorms were former chicken barns. It was like night and day compared to the University of Maine. I said, this is where I want to go. Instantly I knew.”

While at Unity he applied for a summer job as a lab technician at Acheiron Engineering: “The fellow who interviewed me was going to be my boss. I asked if he thought I had a shot at the job. He said, ‘Oh you have the job. I just want to make sure you want it.’” The rest is history.

WEARING MANY HATS

Thirty-two years later, Wendell still works for the same company. It formed ClearWater Laboratory as a subsidiary when it started testing drinking water. The company does toxicity and compliance testing and does consulting for drinking water systems and municipal or industrial wastewater treatment plants. The lab has two part-time and eight full-time employees.

“It’s satisfying because of wearing many hats,” says Wendell. “Every day the job is a little different and a little interesting.” He lives in Solon, Maine, with his wife, Annie Stillwater Gray, a writer and former radio announcer. He describes Solon as a small town in the woods past the last Walmart.

Although ClearWater does not operate wastewater treatment plants, Wendell earned a certification as a wastewater operator early in his career. “In 1996, I’d been working full time for six years, and I got my Grade 2 license,” he says. “Five years later I got my Grade 3 license. One reason I got myself licensed was to educate myself and to lend credibility to my advice regarding treatment plant problems.”

In the 1990s, treatment plants tended to have problems with toxic materials from industrial sources. ClearWater Laboratory did toxicity testing to identify the problem materials, which usually led to identifying the sources. Then the lab team could recommend remedies. Most of the testing is routine, but sometimes the lab encounters unusual samples or situations.

“In the drinking water business, people can come up with funny samples,” Wendell says. “We had somebody show up with a really nasty looking water sample. It was foamy, and it smelled like cinders. He said it came from his well. It turned out that his barn had burned down, and the firemen had used foam to put out the fire. That surely had ruined his well.

(continued)



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Wendell's affinity for laboratories and lab work goes back to his high school days, during which he volunteered as a lab assistant.

"In the wastewater business, sometimes you get surprised by samples that are not what you expect. Every now and then someone says there is something red or some other color coming into the plant and turning the lagoon a different color. Then you try to figure out where that came from and what is it, and do they have to worry about it."

ClearWater has clients all over Maine, and Wendell travels as necessary: "I still do field sampling. We set up samplers to collect stuff for people, monitoring well sampling or field notes. "We document that they are doing it the right way. That's part of being accredited. It's knowing that you're good at dotting I's and crossing T's. That's a good part of our business."

Sometimes Wendell has to update quality assurance manuals and standard operating procedure documents or an operations and maintenance manual for a treatment plant. Many people find that kind of technical writing to be tedious and difficult, but Wendell enjoys it.

"To me, it's creative, because you are always trying to figure out how to say something in a better way that is more accurate with fewer words and less confusing," he says. "It's something I can do, but it doesn't happen quickly. I re-read things three or four times to make sure I have it polished properly. It's a lot of polishing."

DATA INTEGRITY

ClearWater contracts some testing to outside laboratories. In-house procedures include microbiological tests that need to be done within a short time after the samples are collected, such as total coliform, *E. coli* and fecal coliform tests.

The lab uses an IDEXX Colilert system and incubates the tests in either a Lab Line air incubator or a Precision water incubator. It also uses spectrophotometers (Hach) for tests for nitrite, phosphorus or chlorine. Most testing for metals and other substances is outsourced.

"Our laboratory is set up for the shorter-holding-time tests," Wendell says. "We let other labs do the oil and grease, and organics like PCBs and pesticides, for example."

His job also entails documentation of training, equipment, maintenance and other areas, all necessary for the accreditation inspections the lab has to go through. The lab is accredited through the Maine Laboratory Accreditation Program, which confers authority and credibility with clients and regulatory agencies.

Wendell spreads that message statewide through his work as chair of the lab committee for the Maine WEA. His vision for that committee is to provide current information, training resources and moral support to the state's lab professionals and to act as a bridge between the regulated community and the regulators who make the policy decisions.

"You have an accreditation program to ensure there is integrity in the data," Wendell says. "We have to be believed by the client who is paying us money. We may tell them they have to spend some money to fix something, and we have to report to the regulators, the DEP or the drinking water program."

"The regulators have to believe us if we tell them that the client doesn't have a problem. It is of the utmost importance that we as a laboratory, and as a professional organization, maintain credibility with both the regulated community and the regulators." **tpo**



ON THE AIR

Andrew Wendell loves his laboratory job, but he is also a radio producer and performer. He and his wife, Annie Stillwater Gray, produce "The General Store Variety Show."

It's set in the fictional valley of Angel's Notch on the U.S.-Canada border where the lead characters, Annie and Andy, run a general store, and Annie runs a radio station. The one-hour weekly show features skits, interviews, storytelling and music, and each show has a theme. It is carried on several radio stations in Maine and one in New York, and at welcomeradio.com.

Wendell and his wife met while working in community theater, and both had been involved with music and radio. "We had all this music at our fingertips and a circle of friends from various theater groups, as well as musician friends and some writers," Wendell says. "In 1999 we decided we had the wherewithal to produce a one-hour variety show."

The show began in spring of 2000 on WERU, Maine's largest community radio station, and it is now in its 22nd year. In a case of life imitating art, Wendell also became program director of HooSkow Radio, WXNZ, a community station operated by the local arts council. The name comes from the station's location in Skowhegan, and from its studio in a redeveloped building that was once the county jail, aka the hoosegow.

WXNZ, a low-power FM station, broadcasts 24 hours a day. "It serves the greater Skowhegan area," says Wendell. "In a sense we took the fictional idea of a small radio station on the border of Canada and we made it a reality in Skowhegan." All of the material is pre-produced and includes music, poetry, discussions and local event news.

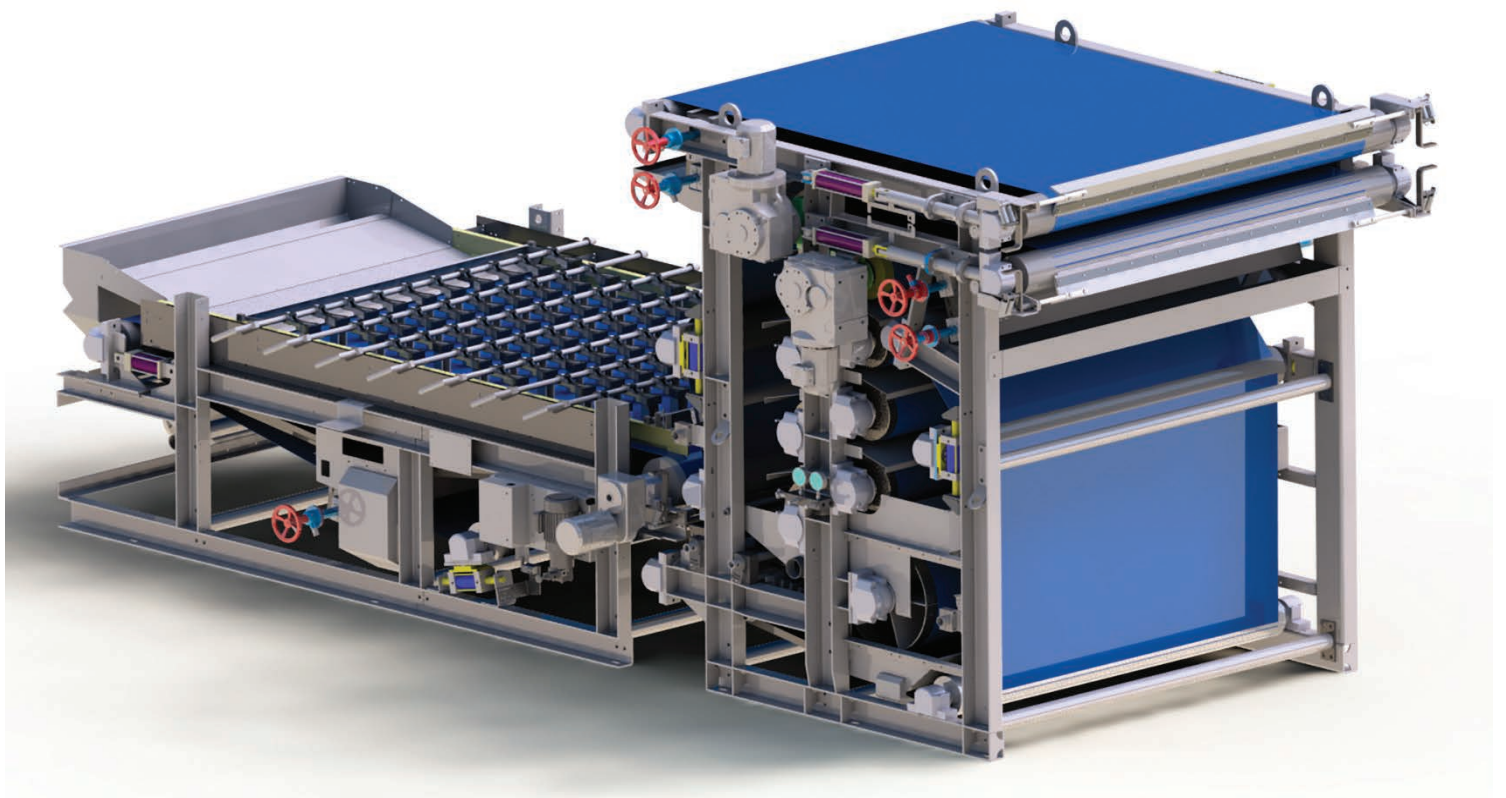
Wendell and his wife still do music programs. Hers features folk, rock, blues and other genres, while his focuses on jazz. Annie and Andy are also in a band, Merry-Go-Roundup, that plays western, vintage and original tunes.

Wendell's life off the job is as busy as at ClearWater Lab: "As much as I dedicate half my life to my profession, I dedicate the other half to my avocation. It's my way of volunteering; it enables me to put part of my life toward the local community."

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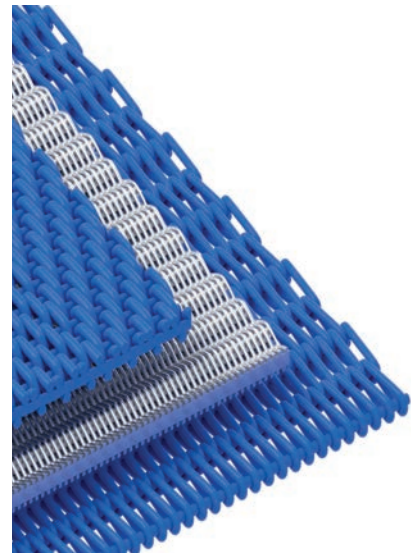


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Fighting Filaments

A WASHINGTON CLEAN-WATER PLANT SUCCESSFULLY TESTS POLYMER ADDITION TO CONTROL NOCARDIOFORM FOAMING IN A HIGH-PURITY OXYGEN TREATMENT PROCESS

By Jessica Tanumihardja

The aeration basins at West Point Treatment Plant in Seattle experienced periodic foaming caused by nocardioform filamentous bacteria.

Although the foaming problem did not significantly affect significantly secondary effluent quality, it made process control more difficult by acting as a barrier for oxygen transfer to the bulk liquid. It was also linked to digester foaming, which proved harder to control. Digester foam can overflow the cover, cause pumps to become gas-bound and reduce digestion capacity.

Plant staff found it prudent to solve the problem at the source instead of downstream. Accordingly, they tested control of secondary process foaming through the addition of a cationic polymer to the return activated sludge. The result indicated that the polymer applied could reduce foaming in both the aeration basins and the digesters.

SEEKING SOLUTIONS

The West Point plant is a combined sewer overflow treatment facility with an average annual design flow of 133 mgd and a maximum instantaneous flow of 440 mgd (300 mgd for the secondary treatment process).

The facility uses a high-purity oxygen aeration process. Therefore, the aeration basins are covered and inaccessible to retain high-purity oxygen in the headspace. This configuration traps the filament generated in the basin and allows it to multiply when growing conditions support it. Microscopic analysis confirmed that nocardioform filament — a branched, hydrophobic filament that traps air and solids in the air bubble — was causing the foaming.

Several methods had been tried to reduce foaming, including as maintaining low sludge age and increasing oxygen flow. Although these helped to curb the effects of the foaming at times, they did not remove the existing foam formed in the closed basin.

The plant's average sludge age is two to three days, already lower than for typical activated sludge plants. Reducing the sludge age to below 1.5 days would reduce solids removal efficiency, as the return and waste activated sludge might be thinner. The sludge age is kept at two days or less during the polymer addition trial described below. Physical removal of the foam is also useful but the only way to skim the foam off was from two 2-foot-wide mixed liquor basin gates.

POLYMER TRIAL

The addition of cationic polymer to control secondary foaming had been used successfully at the San Jose/Santa Clara (California) Water Pollution Control Plant (Lemma et al., 2010) and at several other plants across the United States.



Foam in the mixed liquor channel at the effluent end of aeration basins, before (left) and after the addition of cationic polymer to the RAS line.



Secondary clarifier foam.

FIGURE 1: Filament quantification trend over time, 2019

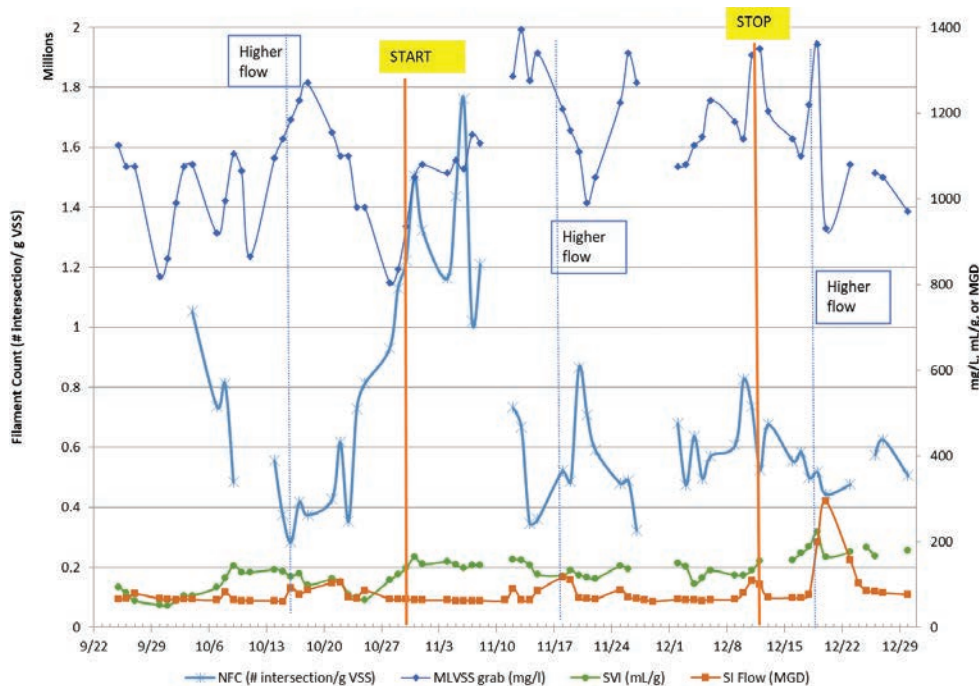
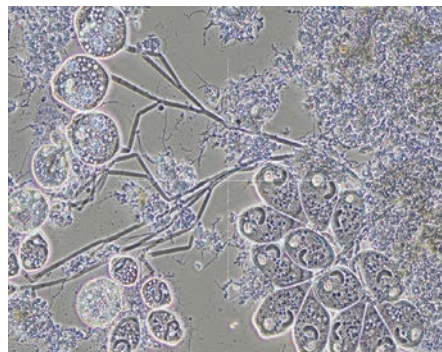
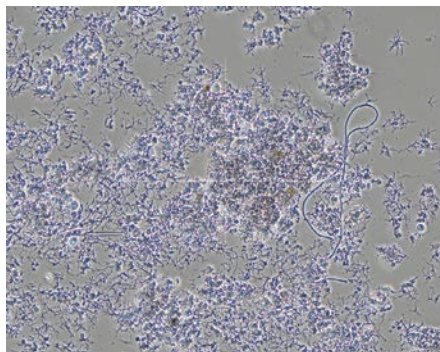
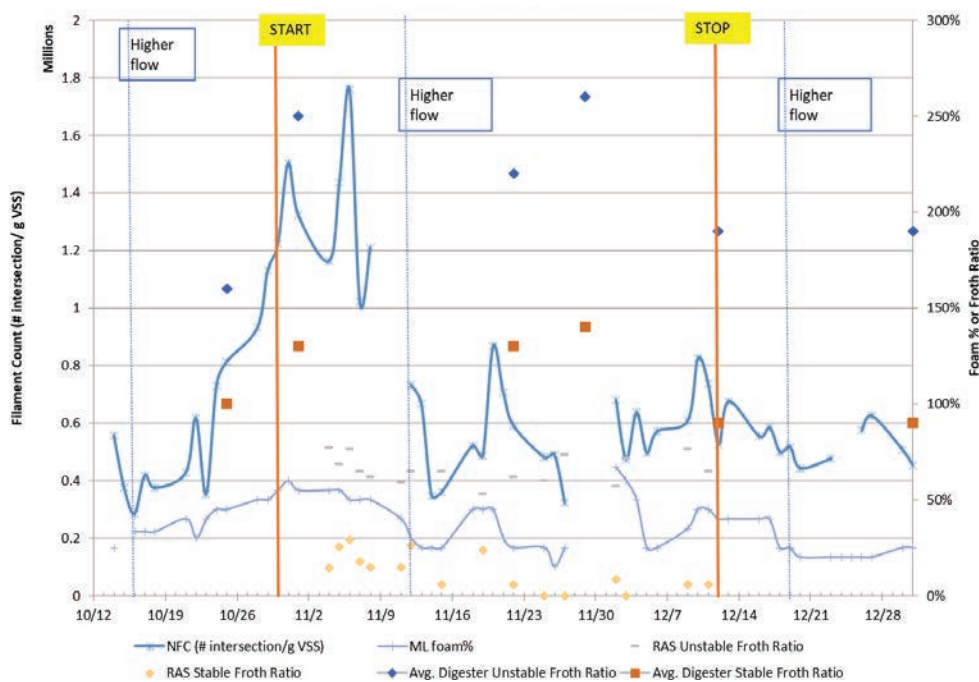


FIGURE 2: Filament quantification and digester frothing ratio



Microscope analysis before (left) and after the addition of cationic polymer to the RAS line.

It had been suggested that the cationic polymer “can solve the *Nocardia* foaming problems by reducing the surface tension created between air bubbles and *Nocardia*-enriched floc that allows *Nocardia* to pass through the aeration basins to eventually escape the sludge treatment system.” (Shao et al., 1997).

The West Point team conducted a RAS polymer addition trial to test whether that method could help reduce and eliminate the foam caused by nocardioform filaments. The cationic polymer used by San Jose/Santa Clara is similar to the dewatering polymer used at West Point. Therefore, the dewatering polymer was selected for the trial.

A polymer blend skid provided by the polymer vendor was used to dilute the polymer in-line and dose it directly to the suction side of a RAS pump. One drawback is that the West Point plant has separate RAS pumps for each of its 13 clarifiers. For the trial, the diluted polymer was added to the suction side of one RAS pump suction side in the middle of the RAS trunk line.

OBSERVING OUTCOMES

The foaming usually occurs during shoulder seasons (when the weather conditions transition from spring to summer or fall to winter). The trial was conducted during a significant foaming episode from October to December 2019. The active cationic polymer dose was increased from 0.5 to 1 mg/l each day for six weeks. The maximum dose was limited to the dilution water flow rate.

A *Nocardia* filament count method via microscopic analysis was used to quantify filaments in the system as the number of intersection/grams of mixed liquor volatile suspended solids (Jenkins et al., 2004). The counting was conducted every weekday. The NFC trend over time is shown in Figure 1. Sludge volume index and secondary influent flow are included in the graph for reference.

There was an increase of NFC and SVI directly after the addition of the polymer. However, both were trending downward after a week (two to three times the plant’s sludge age). A significant reduction in mixed liquor foaming was visually observed after the polymer dose of ≥ 0.75 mg/l. There was a short NFC peak after the high flow, as the flow pushed the foam formed in the closed aeration basin to the mixed liquor channel.

After the trial started, a reduction in digester foaming was also noticed. To quantify the foaming degree in the digesters, a frothing potential test was conducted regularly on sample of digester sludge. Figure 2 shows the NFC versus frothing ratios for RAS and digester samples as well as the Mixed Liquor East basin foam coverage (ML foam %). The unstable froth ratio measures the maximum foaming potential, while the stable froth ratio measures the settled stable foaming potential.

DRAWING CONCLUSIONS

From the initial trial, it is apparent that adding cationic polymer to the RAS line can help reduce the foaming filaments in the secondary treatment process.

Based on discussions with New York City Department of Environmental Protection personnel, higher polymer dosage fed for a shorter period is recommended to eliminate the foaming in the secondary process. However, at the test location, the amount of water available



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for polymer dilution was limited. Further modification to increase the dilution water flow is required before continuing the trial at a higher dose.

No adverse effects on secondary treatment from the polymer addition were noticed during the trial. However, bench tests showed that overdosing the polymer might create floating solids during the settling test. Closer monitoring is recommended while using this method.

It should be noted that extra caution should be practiced when working with polymer. Polymer creates a slick and slippery solution when combined with water. Secondary containment is required for the dosing and storage equipment for safety purposes.

The initial cost analysis showed that adding polymer to the RAS line is a cost-effective option for foaming mitigation. The West Point plant had been adding biodegradable defoamant to mitigate foaming in the anaerobic digesters (both initial and maintenance dose applications). The cationic polymer price per pound is significantly lower than defoamant price, and so it is a more preferable option.

From the initial trial, it is apparent that adding cationic polymer to the RAS line can help reduce the foaming filaments in the secondary treatment process.

This method also reduces the impact of foaming before it reaches the solids process, which also reduces operators' time to clean up foam overflow at the mixed liquor channel or digester covers and to backflush gas-bound digester mixing pumps.

Further tests are needed to evaluate whether higher polymer doses (with higher dilution water flow) can eliminate the foam in secondary process. One

treatment plant staff member suggested that a higher dose be applied in the first few days, approximately one sludge age, to observe whether a more significant improvement occurs. The staff intends to test that in the next season.

ABOUT THE AUTHOR

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The team at the Rome Water Utility includes, from left, Cody Knoblock, operator; Joe Solis, operator; Chad Ziegler, utility director; and Roberta "Robbie" Schaub-Ruemler, accountant and office manager.

From Private to Public

CHAD ZIEGLER AND HIS TEAM HELPED A SMALL WISCONSIN WATER UTILITY NAVIGATE AN OWNERSHIP TRANSITION AND, ALONG THE WAY, RESOLVE A VARIETY OF ISSUES

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **Erin Reinke**



In 2006 Chad Ziegler inherited a small water utility that had just changed from private to public ownership – and one with a variety of problems that needed solutions.

At the time Ziegler became its director, the newly designated Rome Water Utility in central Wisconsin had two old wells high in nitrates and a newer well with water containing iron and manganese that caused color, taste and odor issues. There were also problems with dead ends in the distribution system, a flat-rate billing system with no customer water meters, and more.

Today, 15 years later, the utility is on a firm footing with two wells, an efficient iron and manganese removal system, new ultrasonic meters in the homes and an automated meter reading system. The utility was recognized with a 2019 Small System Excellence Award from the Wisconsin Section AWWA.

In presenting the award the AWWA section observed, “Chad Ziegler does an excellent job of operating the utility and implementing programs to keep it running effectively and efficiently. ... Ziegler does an excellent job of diagnosing problems early and implementing solutions before the situation becomes a crisis. He also helps neighboring systems when they need operational assistance. Rome Water Utility exemplifies what a small water system should strive to be.”



Rome (Wisconsin) Water Utility

romewi.com/water-utility

**BUILT:
2006**

**POPULATION SERVED:
Approx. 1,000 year-round**

**SERVICE AREA:
Lake Camelot, Rome Town Center**

**EMPLOYEES:
4**

**FLOWS:
1 mgd capacity, 400,000 gpd
peak season, 50,000 gpd winter**

**SOURCE WATER:
Two groundwater wells**

**SYSTEM STORAGE:
250,000 gallons**

**DISTRIBUTION:
35 miles of water mains**

**ANNUAL BUDGET:
\$1,035,000 (operations)**

**KEY CHALLENGES:
Iron and manganese removal,
distribution issues**

SERVING A LAKE COMMUNITY

What is now the Rome Water Utility began as a private utility serving properties around Lake Camelot, a 393-acre manmade lake in Adams County. There are similar developments around nearby man-made lakes Sherwood (215 acres) and Arrowhead (295 acres).

Lake Camelot was created in the early 1960s and is surrounded by 1,875 half-acre parcels. About 1,200 lots have homes, most of them seasonal. About

“Our challenges really started in the beginning. There was very little money. There were no meters, just one set rate.”

CHAD ZIEGLER

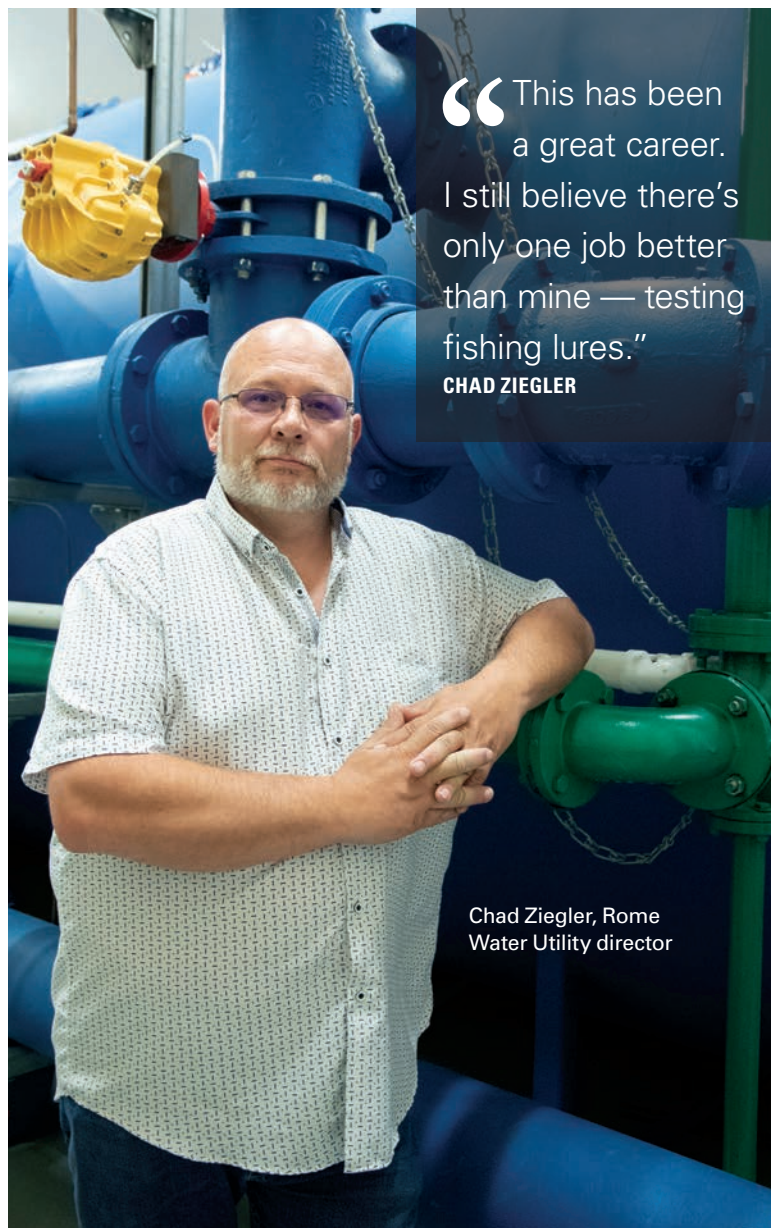
400 are used as campsites, and the rest are vacant. The occupied lots have septic systems.

The Rome utility serves about 1,400 connections around the lake, along with Rome Town Center, home to a few businesses and apartment buildings. The two wells can pump up to 1 mgd; the average flow of 350,000 to 400,000 gpd during the peak season drops to about 50,000 gpd in winter. The water tower holds 250,000 gallons.

Originally the system was owned by the Lake Camelot Property Owners Association. “They had one well, a booster pump and a storage reservoir,” says Ziegler. “That fed the system through the late 1980s. Then Well 1 started developing nitrates, and so they drilled Well 2 in 1990. By 1999, both wells had nitrates.” The likely source of nitrates was a nearby farm; nitrates from fertilizer could leach easily through the area’s sandy soil.

“They were looking to drill a third well,” Ziegler says. “Then the DNR [Department of Natural Resources] was concerned because their two wells only had a manual backup generator; if they lost power, they lost pressure to the system. So the DNR wanted a stand tower. In 2000, they drilled Well 3. In 2002-03 they built the water tower.”

In 2004, the Town of Rome bought the system for one dollar and made it a municipal water system. A key reason for the sale was to gain access to the low-bonding interest rates available to municipal entities.



“This has been a great career. I still believe there’s only one job better than mine — testing fishing lures.”

CHAD ZIEGLER

Chad Ziegler, Rome Water Utility director



Ziegler keeps a close watch for leaks with help from a Beacon automated metering system (Badger Meter).

BOOSTING QUALITY

Ziegler came on board in 2006. He kept wells 1 and 2 on standby, hoping to find a way to deal with the nitrates, but found the remedies too costly. As an interim measure, he mixed water from Well 1 and Well 3 to dilute the nitrates, until Well 4 came online in 2007.

However, the water from wells 3 and 4 (each 650 gpm capacity) were high in iron (0.7 to 1.0 ppm) and manganese (1.6 to 2 ppm): “People would see a lot of black coming around their faucets, and toilets would start turning red.”

The solution was a removal system (Evoqua Water Technologies) based on media filtration, installed in 2006. The well water is dosed with sodium permanganate to precipitate the iron and manganese ahead of the filter, which has four cells with anthracite, gravel and sand media. The filter is backwashed on a timed basis using raw well water. The filtered water contains about 0.01 ppm manganese and essentially zero iron.

“The filter has done wonders,” Ziegler says. “On the day I started here, which was Jan. 21, 2006, I got a phone call from a neighbor who had me come over. He said, ‘What are you going to do with this water quality?’

“He started his washing machine, and it was red — just iron, iron, iron. In that year we would get at least five people a week complaining.” Today, such complaints are rare: “We still get a little bit through because there’s a lot inside of our old mains. We do flushing twice a year to make sure we get out as much as we can.

METERING USAGE, MONITORING LEAKS

An automated meter-reading system doesn’t just enable the Rome Water Utility to bill customers accurately and efficiently. It also helps to protect their homes against damage from water leaks.

That’s a valuable capability in a service area with many seasonal homes, where a leak might otherwise go undetected for weeks or months. Before the utility acquired the BEACON metering system from Badger Meter in 2018, four houses had to be torn down because of mold caused by broken water lines.

“People would be gone all winter long, and I would know there was a leak, but I couldn’t figure out where it was,” recalls Chad Ziegler, utility director. “I’ve seen a million gallons go through somebody’s house. I’ve seen hundreds of thousands of gallons.”

Once while reading meters with the utility’s previous drive-by technology, “I drove around a cul de sac and the sun caught a basement window,” Ziegler says. “It shined with this wicked glare.” He

stopped, backed up and looked inside: “All their floaty toys and their blow-up boat for the lake were floating around the basement.”

The utility changed out its meters with Badger Meter E-Series ultrasonic units that communicate with the office by way of antennas and five gateways. From the office, utility staff can detect when a leak in a household is occurring.

“If there is a continuous flow over one gallon per hour for 24 hours, the system will alarm us,” Ziegler says. “There’s a break; they’re still going to have water in the home, but it’s not going to sit there. It won’t go on for up to three months until the next time we read the meter.”

When a leak is detected, a staff member is dispatched to double-check that something is leaking. If the volume is high, the water can be shut off at the curb stop. In the meantime, Ziegler notifies the homeowner. Often there is only a minor problem, such as a leaky toilet or a garden hose not fully shut off. Still, customers are grateful for the notification.

The BEACON system can include a portal by which homeowners can monitor their water usage.

"Fifteen years ago, you would go to a hydrant to flush it, open it up as fast as it would go, and then slow it down a little bit. You would sit there for two hours before it cleared up. Today, sometimes five minutes and you're done."

Before distribution, the filtered water is dosed with fluoride. AQUA MAG blended polyphosphate (Carus Corp.) is added to maintain a protective coating on the pipe interiors and prevent copper leaching; chloramine is added for disinfection. "Because we have the lake across the street, we noticed a lot of organics eating up our chlorine residual," Ziegler says, "so in 2013 we changed over from free chlorine to chloramines."

EVER IMPROVING

Tackling challenges is a way of life for Ziegler and team members Joe Solis, operator, and Roberta "Robbie" Schaub-Ruemler, accountant and office manager. (Team members George Treul and Kathy Doods retired in 2020 after 15 years of service.)

"Our challenges really started in the beginning," says Ziegler. "There was very little money. There were no meters, just one set rate. Between 2006 and early 2007 we installed 1,100 meters. That helped us try to find more water leaks."

"Our issue then was that we still had unlimited use for campers; they didn't have to have meters, but still we narrowed it down. When I started we were pumping probably 500,000 gpd. Now it's 350,000 to 400,000 gpd. People conserve a bit more when usage is not unlimited."

Another issue is dead ends in the distribution system, largely because many of the properties surround cul de sacs. "When I started there were 84 dead ends," says Ziegler. "We did a looping project in 2007 around the outskirts of the system. Now we're down to 42 dead ends and there is more free flow."

Water main sizing is an additional concern: about 95% of the system consists of 3-inch mains. "You don't get a lot of velocity or flow out of 3-inch water mains," says Ziegler. "Back in the 1960s, 1970s and 1980s, there weren't a lot of homes yet, and so water pressure was never an issue. Today it gets to be a little bit of an issue."

"People don't notice it so much because of the looping projects we did, but if everybody was here during the week and they all flushed the toilet at the same time, they would notice a pressure loss."

Those three-inch mains of transite concrete pipe are also swelling in places where the pipes lie below the water table. "We've got 3 to 5 feet of groundwater above our mains in some places," says Ziegler. "Some of those mains are 4.2 inches now. They're starting to become really oversized. Right now we don't have a lot of breaks or leaks, but I have a feeling that will be coming soon, as much as they are swelling up."

DETECTING LEAKS

Leak detection is difficult in an area where, Ziegler says, "You could dig to China through pure sand. Leaks don't surface very quickly. I watch my SCADA system closely. I can tell when a hydrant is opened up. I measure my nighttime flow between midnight and 4 a.m. I look at it periodically through the week to see if we're using the same amount of water during that time."

"Once my usage starts to go up, I know there's an issue. Finding it still is a problem. Leak detection companies have come in, and it's tough for them because unlike a normal city, we don't have a valve and a hydrant at every corner." The utility's automated meter reading system does help quickly detect leaks within homes.

Meanwhile, the utility has a strong financial position; a Safe Drinking Water Loan for the main building, Well 4 and the 2007 looping project will be paid off in 2027. "We're talking about expansion and we're also talking about replacing some of the water mains that are getting so big before we do have an issue," Ziegler says.

IN MEMORY

The team at the Rome Water Utility mourns the passing of Brianna Ginter, 22, who died on July 4 in a UTV accident. "Brianna started with the water utility in August 2020 as a technician," notes Chad Ziegler, utility director. She gave her all every day to ensure that customer needs were fulfilled in a timely manner.

"Brianna always brought so much light into the lives of those around her. She was anxious to please, willing to lend a hand, and a joy to be around. She became an amazing team member, and we were so saddened by her passing."



Brianna Ginter



Joe Solis uses a Hach DR1900 spectrophotometer to test water in the lab.

"This is a very unique water system. We've done pretty well over the last 10 years getting our system back in order. We're starting to add valves in different places. We're adding some flushing hydrants to areas that have dead end problems and flushing problems."

"One thing I stress the most with my team is cleanliness, especially at the well houses. If somebody walks into a well house and it's totally dirty, that reflects on your water utility."

"This has been a great career. It has been challenging for the way this utility was developed. I still believe there's only one job better than mine — testing fishing lures." **tpo**

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The video series shares information on water infrastructure and how the utility works to maintain safe and reliable drinking water, sewer and storm-water services. Shown from left are Nancy Lilly, stormwater outreach coordinator, and Lilly Meighan, education and outreach coordinator.



‘Water Lillys’ at Work

TWO TEAM MEMBERS AT A VIRGINIA WATER UTILITY RESPOND TO THE COVID PANDEMIC BY CREATING AN AWARD-WINNING SERIES OF INFORMATIONAL VIDEOS

By Sandra Buettner

The Lynchburg water utility was all set for two weeks of jam-packed field trips celebrating Earth Day and Arbor Day in 2020 with schools and community groups.

Then suddenly COVID came on and the city went on lockdown. “We knew we needed to continue to maintain our presence in the community so as a temporary approach, we filmed a few water videos for the public, schoolteachers and families who were home-schooling their children,” says Lilly Meighan, education and outreach coordinator.

“We realized how popular the videos were getting and COVID was not going away any time soon, so we continued them and expanded the topics.” The messages have taken hold in sometimes surprising ways.

Meighan reports, “A parent who was watching the videos with her daughter informed us that she had deemed herself the Water Watcher and started correcting everyone at home when they were putting the wrong items down the drain or toilet,” Meighan says.

Meighan is one of two creators and producers of the Water Wonders videos. The other is Nancy Lilly, stormwater outreach coordinator. Before the pandemic, as they were giving a presentation at the local children’s museum, someone introduced them as the Water Lillys. The name stuck and has been used in the videos ever since.

The Lynchburg Regional Resource Recovery Facility handles an average of 13 mgd. In addition to the city, it serves the Virginia counties of Amherst, Bedford and Campbell. It is one of the oldest utilities in the United States.

VIDEO VIGNETTES

All videos are water- and environment-related and last two to five minutes. The Lillys started out making one a week and now create one per month; there were 31 on the Water Wonders website as of March, and more were being planned. The Water Lillys write the scripts and self-produce and appear in them, so the costs are very low.

Ideas come from the utility staff, schoolteachers and the producers. Meighan and Lilly pick topics that are trending with residents, such as water main breaks and aging infrastructure. They work with teachers to gear the videos and field trips to school curriculum.

The videos range from telling what to flush and not flush, to water wildlife and its importance to the ecosystem. The producers also film what is going on in the field to show residents what the utility is working on.

The videos are for all ages, although they were first targeted for children who were at home during the lockdown. As parents started watching them



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Let's Solve Water



A popular video highlights the utility's "Scoop the Poop" campaign. Pictured are Lilly Meighan (left) and Nancy Lilly; and Clean Water Canines (from left) Athena, Fisher and Junie.

with their children, the Water Lillys saw the appeal and changed their focus. They started including information on how residents' decisions may affect water resources.

PROMOTING THE VIDEOS

Meighan and Lilly send the videos out to the science coordinators from the schools and the teachers. They also promote the videos on the utility's Facebook, Instagram, YouTube and Twitter accounts.

The videos are also posted on the utility's website (www.lynchburgva.gov/water-wonders). The utility started the hashtag #WaterWondersWednesday so that viewers can receive alerts to new videos. They send several notices announcing new releases, mimicking the way big-screen movies are premiered.

“We discovered that the video program was a great team building and employee engagement tool.”

LILLY MEIGHAN

“We discovered that the video program also was a great team building and employee engagement tool,” says Meighan. “There sometimes can be a disconnect between the office staff in the utility, plant operations and employees in the field. This has helped to bridge the gap. Field team members regularly submit ideas now.”

WIDELY VIEWED

A blooper film was used as a morale booster to help the staff get through the pandemic. Blooper clips were inserted between the utility's strategic planning and other water leadership meetings and were popular with the staff.

To date, the videos have been viewed more 17,000 times, an average of nearly 600 views per video. Educators using and enjoying them; the Water Lillys are recognized around town, and so are videos' messages.

The program has won several awards including the National Association of Clean Water Agencies Environmental Achievement Award in the Public Information and Education E-Media category. The Lillys also won a Virginia AWWA award and as of March were finalists for two other regional awards. **tpo**

What's Your Story?

TPO welcomes news about your public education and community outreach efforts for future articles in the Hearts and Minds column. Contact editor@tpomag.com or call 877-953-3301.



A Doggone Good Investment

A SPECIALLY TRAINED RETRIEVER HELPS CENTRAL ARKANSAS WATER FIND DRINKING WATER LEAKS AND DOUBLES AS A PUBLIC RELATIONS REPRESENTATIVE

By Steve Lund

Officials at Central Arkansas Water decided in 2019 to get serious about leak detection. So they bought a dog.

“Dogs can identify lots of things,” says Douglas Shackelford, director of public affairs and communications. “They are trained to sniff and identify something, whether it’s drugs or explosives or anything they can train on. Trainers can take that ability and instead of the dog sniffing out explosive material or gunpowder, they’re training on chlorine.”

Central Arkansas Water serves about 500,000 people in and around Little Rock, pumping about 68 mgd through nearly 2,800 miles of pipes. Vessel, a Labrador retriever mix, and handler Tim Preator investigate leaks reported to the utility and even find leaks that haven’t surfaced.

CANINE ADVANTAGES

Vessel has a couple of advantages over other leak detection methods, even some high-tech methods such as using satellite imagery. Her nose can distinguish between treated and untreated water. Is that puddle along the road from a water main leak? Or is it just stormwater? Vessel can tell, because she’s looking for the scent of chlorine.

“She’ll work in a pattern, nose to the ground, trying to find water,” Shackelford says. “Once she finds it, she’ll sit and look back at her handler. He’ll say, ‘What did you find?’ If she finds the scent of chlorine, she’ll speak back; she’ll bark.” She is then rewarded with her favorite object, a tennis ball that Preator always keeps in his pocket.

Every time she discovers chlorine, whether it’s a main leak, a training exercise or a demonstration for a school group, Vessel gets to run after the ball.

Her intense desire to play ball is what made her a washout as a service dog. “Vessel was going to be a service dog for someone with PTSD, or perhaps a seeing eye dog,” Shackelford says. “But she had a high ball drive: when they showed her the ball, she would forget her training and go for the ball.”

ABOVE LEFT: Vessel with her favorite object, a green tennis ball. ABOVE: Vessel with the Central Arkansas Water truck in which she and her handler travel.

HIGHLY ACCURATE

When Central Arkansas Water reached out about training a leak-sniffing dog, Vessel’s trainer thought she would be a good candidate. Training began with canisters of chlorine, large ones at first but gradually smaller, and Vessel became extremely sensitive to the scent.

“Her nose is so sensitive that she can find a difference in chlorine concentration,” Shackelford says. “There could be a large pool of water, but because she is so sensitive, she can pinpoint the higher concentration, which is probably closer to the leak. She can pinpoint the leak even more than a satellite could. That could enable us to dig once and repair the leak on the spot.”

Before obtaining Vessel, the utility had tried many ways to find leaks. “We have done just about everything there is,” says Shackelford. “Unaccounted-for water is a big deal, and trying to find leaks is a struggle, especially if they don’t surface. Vessel can find leaks without digging. She can

“Vessel is an ambassador for water here in Central Arkansas. The community sees her as a celebrity. They can’t wait to get their picture taken with her.”

DOUGLAS SHACKELFORD

smell a little bit under the soil and tell the difference between rainwater or groundwater and treated drinking water.” On her first 100 work orders, she was 97% accurate.

PUBLIC RELATIONS ASSET

Vessel’s other advantage over competing methods is her popularity with customers. “Vessel is an ambassador for water here in Central Arkansas,” Shackelford says. “The community sees her as a celebrity. They can’t wait to get their picture taken with her when they see her.

“She brings an awareness to the community that you don’t always get with a spokesperson like me going on the morning news show talking about sprinkler usage or watershed protection. Everybody wants to see Vessel, and all of a sudden, they are thinking about drinking water in general, and that’s a great benefit to us. She’s very much a PR person.”

Vessel and her handler have their own truck with the utility’s logo on it; plans call for having the truck wrapped with a big image of Vessel.

Preator is Vessel’s second handler; the first was Stephen Sullivan, who was working in the distribution department when the utility obtained the dog. He had experience training hunting dogs; he worked with Vessel successfully for more than a year but then was promoted to a different position. Preator answered the utility’s ad for a new handler.

“Tim came to us from the Pulaski County Sheriff’s Department, where he was a canine officer,” Shackelford says. “We had to teach him water, but he already had a great understanding about how to handle service dogs.” Vessel lives with Preator and his family.

When there are no work orders for leaks to be investigated, Preator and Vessel sometimes walk easements just to see what she finds. “If we suspect there is a leak in a pressure zone, we’ll send her out to walk easements,” Shackelford says. “It’s a chance for her to find leaks that we don’t know exist. She’s pretty successful. They can be very small, minute leaks. She’s not triggering on the amount of water; it’s the chlorine.”

FIRST BUT NOT ONLY

CEO Tad Bohannon, while on an international studies program in Great Britain, heard of a dog in Scotland that had been trained to detect leaks. “He came into my office and said, ‘Hey, I think we need to get a dog,’” recalls Shackelford.

The staff began searching for a dog and someone to train it. “Only then did we realize that this dog would be the first of its kind in North America,” says Shackelford.

Since Vessel has been so successful, other utilities have investigated using dogs to detect leaks. The company that trained Vessel, On the Nose Detection Dogs in Roland, Arkansas, now advertises that it trains leak-detecting dogs.

“Now there are actually several,” Shackelford says. “Those companies reached out to us. I think it’s going to become more of an industry standard to use dogs to identify and pinpoint leaks. The return on investment has been very high, not only with the success of finding leaks, but also the exposure for the utility. **tpo**



Is it stormwater or treated water? Vessel, with handler Tim Preator, can tell the difference.

SUEZ introduces new PFAS testing in Texas

SUEZ Water Technologies & Solutions announced the expansion of its PFAS service offerings in Tomball, Texas. With a new capability to analyze water samples for ultra-low, trace levels of PFAS, SUEZ can identify the specific types of PFAS present in customers’ water, then create a customized treatment plan to best remediate the contamination. SUEZ’s lab uses the same advanced testing equipment and processes as certified PFAS testing labs, providing a cost effective, efficient and convenient testing option.

Little Giant celebrating 80th anniversary in 2021

Franklin Electric brand Little Giant is celebrating its 80th anniversary in 2021. The company is marking the occasion with a series of initiatives planned throughout the year, including a revitalized brand look.

Flowrox sells valve and pump business to Neles

Flowrox sold its valve and pump businesses to Neles, a Finnish manufacturer of industrial valves. The deal also includes the Flowrox brand. Flowrox’s industrial automation, environmental technologies and filter business are excluded from the acquisition and will continue under a new, later to be announced name and brand. With the transaction, approximately half of Flowrox’s personnel will transfer to Neles.

Next Filtration Technologies and Argonide join forces

Next Filtration Technologies has partnered with Argonide Corp. to provide a new microbiological removal system. In conjunction with Next’s Scale Stop Template Assisted Crystallisation water treatment units, Argonide’s advanced filtration technology will provide a microbiological treatment that also removes scale and hardness.

Endress+Hauser names new service provider for Pacific Northwest

Field Instruments and Controls will be Endress+Hauser’s authorized service provider for Oregon, Washington and the Idaho panhandle. The company, formed in 1987 and based out of Woodland, Washington, has been an Endress+Hauser sales representative for the past 12 years.

Grundfos installs solar panels at its Ontario facility

Grundfos announced it installed a new solar panel system at its Oakville, Ontario, facility. In a release, the company stated the system was installed as part of its Global Strategy 2025 to reduce Grundfos’ water consumption and CO₂ emissions by 50%. **tpo**



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A Happy Detour

PAUL DESROSIER HAS MADE A GREAT CAREER IN THE CLEAN-WATER BUSINESS, AND ALONG THE WAY HAS USED SKILLS HE ACQUIRED IN HIS EARLY YEARS AS A TEACHER

STORY: **David Steinkraus** | PHOTOGRAPHY: **Joe Vericker**



Paul Desrosiers, technical advisor for operations with the Narragansett Bay Commission

“With wastewater, you’ve got a finished product every day. You can look at that effluent and say, ‘Wow, this is great.’”

PAUL DESROSIER

An economic downturn gave Paul Desrosiers his start in wastewater. At the time, a few decades ago, he thought his detour away from teaching would be temporary.

Desrosiers is technical advisor for operations with the Narragansett Bay Commission in Rhode Island. Until two years ago he was superintendent of the commission’s Field’s Point Wastewater Treatment Plant, one of two that collect wastewater from Providence and surrounding communities.

Desrosiers enjoyed the superintendent’s job, yet there was a strong in-house candidate to succeed him. To nurture talent and take advantage of Desrosiers’ experience, his superiors created the technical advisor position for him. “I’ve kind of got the best of both worlds: assist with decision-making but no midnight phone calls,” he says.

He was the winner of a 2019 Carmine J. Goneconte Award from the Rhode Island Clean Water Association and a 2019 Regional Wastewater Treatment Plant Operator of the Year award from the U.S. EPA New England office.

DOWNSIDED FOR THE BETTER

That economic decline that changed Desrosiers’ career course came in the late 1970s. Desrosiers graduated from the University of Rhode Island with a degree in education and had taught elementary school for a couple of years. When schools were consolidated because of the downturn, Desrosiers, having little seniority, was among the first to be let go.

After a few months he hired on as a counselor under the Comprehensive Employment and Training Act in the town of West Warwick, where he helped unemployed people return to the workforce. During five years there

Paul Desrosiers, Narragansett Bay Commission Providence, Rhode Island



POSITION:
Technical advisor, operations

EXPERIENCE:
38 years in the industry

EDUCATION:
**Bachelor's degree, education,
University of Rhode Island**

CERTIFICATION:
Rhode Island Grade IV and

**Massachusetts Grade 7
Wastewater Operator; New
England WEA Grade IV voluntary
collection system certification**

GOAL:
**Help successfully develop
supervisory staff at both
commission facilities**

In his advisory role, Desrosiers can support the superintendents of the Narragansett Bay Commission's two clean-water plants and make sure institutional knowledge is protected and shared.

he also worked in the town's personnel department, helping set up eligibility lists for jobs in the police, fire and public works departments.

When his CETA contract was about to end, he put his name on the eligibility lists for public works and wastewater treatment. The wastewater job had rotating shifts that would allow him to interview for teaching jobs, in 1983 he was hired at the West Warwick treatment plant.

"The day I started was the same day the town hired a company to do contract management of the facility," he says. He worked there for about six months while his supervisor talked about cutting staff. He took a job with the contract company as an operator at the wastewater plant in Fall River, Massachusetts, but it was a midnight shift about 30 miles from his home. So after six months he joined the Rhode Island Department of Environmental Management as a wastewater treatment plant inspector.

When he saw an opening for a training specialist at the Narragansett Bay Commission (then a state agency, now a quasi-government agency), he saw an opportunity to use his education degree. He got the job, and when one of the wastewater plant supervisors left, Desrosiers asked if he could fill in two days a week. In 1992, he became assistant superintendent at Field's Point.

ACQUISITION AND CHANGE

About 1995, the commission took control of the Bucklin Point wastewater plant, and that brought a change for Desrosiers. His boss, Carmine Goneconte took on the job of putting the Bucklin Point plant, which had



deteriorated for lack of funds, into good condition. In 2015, He assigned Desrosiers to oversee the Field's Point plant.

Now, in his adviser position, Desrosiers can support to the superintendents of both plants and ensure that institutional knowledge is preserved and transmitted. Many questions that come to him concern the biological treatment system at Field's Point.

"We have the largest IFAS system in the world," Desrosiers says. "That's integrated fixed-film activated sludge." When the Kruger-designed system was installed in 2012, plants using the technology treated about 1 mgd, Desrosiers says. Field's Point today is a 77 mgd plant, with a 123 mgd wet-weather capacity.

Given the restricted space on the Field's Point site, the compact IFAS meant the aeration system, including HSi turbo blowers and multistage blowers from Atlas Copco, APG-Neuros Turbo Blowers and Howden single stage blowers, wouldn't have to be expanded. "We could create zones within each tank and adequately remove nitrogen. That was the driving factor," Desrosiers says.

From May 1 to Oct. 31, effluent nitrogen must be less than 5 mg/L because the algae that thrive on nitrogen are most active in warmer weather, which



This Goldwind wind turbine is one of three that deliver electricity to the Fields Point treatment plant and sometimes produce an excess of power for export to the utility grid.

is also when the breakdown of dead algae can create hypoxic conditions in Narragansett Bay.

The IFAS system uses floating artificial media to increase treatment surface area in a sequence of pre-anoxic, aerobic, post-anoxic and re-aeration zones. When water flows out of the IFAS tank, the artificial media are stopped by cylindrical wedge-wire screens.

TWO OPPOSITES

For the past four years Field's Point has not had to add alkalinity or carbon to support nitrogen removal. "If I had to describe our system, I would say we had an undersized aeration system and an overabundance of final clarifiers," Desrosiers says.

There are nine clarifiers (ClearStream Environmental), each holding 1.3 to 1.4 million gallons. But if an aeration tank is taken offline when flows are high, the plant may struggle to meet permit limits, Desrosiers says. The needs of IFAS also required the plant team to be creative.

Screw lift pumps (Lakeside Equipment) move water about 16 feet up from the primary clarifiers to the IFAS tanks. The team knew the pumps would introduce air to the water, which then flows into the first IFAS anoxic zone. To correct that, the team recommended adding some of the return activated sludge upstream of that zone to use up some of the dissolved oxygen.

Aside from IFAS, Field's Point is a standard activated sludge plant; it disinfects with chlorine. Bucklin Point is also activated sludge but uses UV

COGENERATION AND MORE

It's common for wastewater treatment plants to use some of their biogas to meet energy needs. The Narragansett Bay Commission has a more extensive renewable energy initiative.

"We have three 1.5 MW Goldwind wind turbines," says Paul Desrosiers, technical operations advisor for the commission's treatment plants at Field's Point and Bucklin Point. The two treatment plants are Rhode Island's largest and treat most of the wastewater from Providence and surrounding communities. The turbines are at the Field's Point plant on the city's south side.

"We hoped they would offset our electrical use at the plant by 40%, and it's been closer to 50%," Desrosiers says. "We generally use about 1,700 kW. On a windy day, one turbine can supply almost all the power we need for this plant. "The others, if they're producing, the meter spins backwards, and we send power out to the grid."

The Bucklin Point plant, several miles away on the east side of the Providence River, has three anaerobic digesters. Its cogeneration system produces heat in addition to 630 to 640 kW; the plant demands about double that amount.

The commission owns shares in four other wind turbines in the state and has bought into a solar array in Richmond, Rhode Island. As of 2020, renewable energy met 78% of the two plants' energy needs.

for final disinfection (TrojanUV4000 from Trojan Technologies). In wet weather there is disinfection with sodium hypochlorite followed by dechlorination with sodium bisulfite.

Bucklin Point (46 mgd design and 116 mgd wet-weather flow) is the opposite of Field's Point in that it has more aeration capacity, using Roots single stage blowers (Howden) and APG-Neuros turbo blowers, but only six final clarifiers (Hi-Tech Environmental), four of which are shallow and sometimes require polymer to aid settling. Two more clarifiers are planned.

“If you were to put a face on the Narragansett Bay Commission, it would have been Carmine Goneconte's.”

PAUL DESROSIERS

During the seasonal nitrogen restriction, Bucklin operators use a four-stage process with anoxic, aerobic, post-anoxic and re-aeration zones. During winter, operators repurpose tanks to use a modified Ludzak-Ettinger process with a single anoxic zone followed by three aerobic zones.

The collection system is equipped with tide gates, custom-made in-house, for the outlets of combined sewer overflows. That is necessary for an ocean coastal system where

high tides can push water back into the treatment plant, Desrosiers says. The collection system also includes a 3-mile-long, 26-foot-diameter, 65-million-gallon deep tunnel to store wet-weather flows for later treatment.

GOOD BOSS

For most of his time with the Narragansett Bay Commission, Desrosiers worked under Goneconte and was the first recipient of the state award named for him. Goneconte died in October 2016 at age 60, only a year after he made Desrosiers Field's Point superintendent.

"We lost him way too young," Desrosiers says. "Carmine had a background very similar to mine. He was a teacher. He went to Rhode Island College and couldn't find a job coming out of school. The economy was tough.

He ended up getting a job in the laboratory for the old city of Providence treatment plant before the Narragansett Bay Commission took it over.”

Goneconte was active in the Rhode Island Clean Water Association and the New England Water Environment Association. He was among the people who came up with the idea for the Water Environment Federation Operations Challenge.

“He was just a great guy to work for, and we had a complementary skill set,” Desrosiers says. “He loved dealing with people and personnel issues, and I was more the process guy. It was a great relationship for 22 years.”

When Goneconte passed, Desrosiers asked the Rhode Island Clean Water Association to create a plaque in his memory and rename the groups Operator of the Year Award in his honor. “If you were to put a face on the Narragansett Bay Commission, it would have been Carmine Goneconte’s,” he says.

SURPRISING CAREER

Although Desrosiers never got back to full-time teaching, he likes where he is, and he did teach a bit as a training specialist for the commission and at the Community College of Rhode Island, where he taught the treatment class for entry-level operators.

Although he has personal awards, Desrosiers says one that he likes best came in 1995, when the EPA gave the commission its National Excellence Award for having the best-operated and maintained large secondary wastewater treatment plant in the country.

“To tell you the truth, I love what I do,” Desrosiers says. “Teaching is a lot of intangibles. You hope that you get through to people. You hope that they learn. But with wastewater, you’ve got a finished product every day. You can look at that effluent and say, ‘Wow, this is great.’” **cpo**

“If I had to describe our system, I would say we had an undersized aeration system and an overabundance of final clarifiers.”

PAUL DESROSIERS

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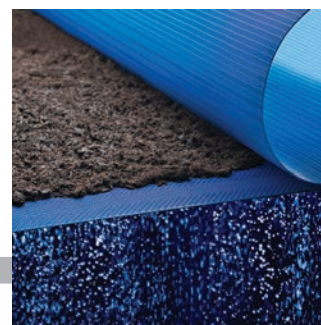
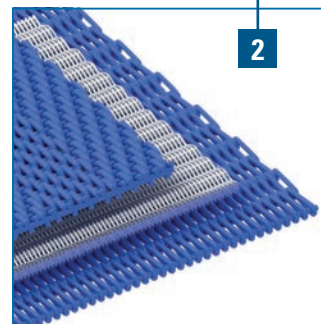
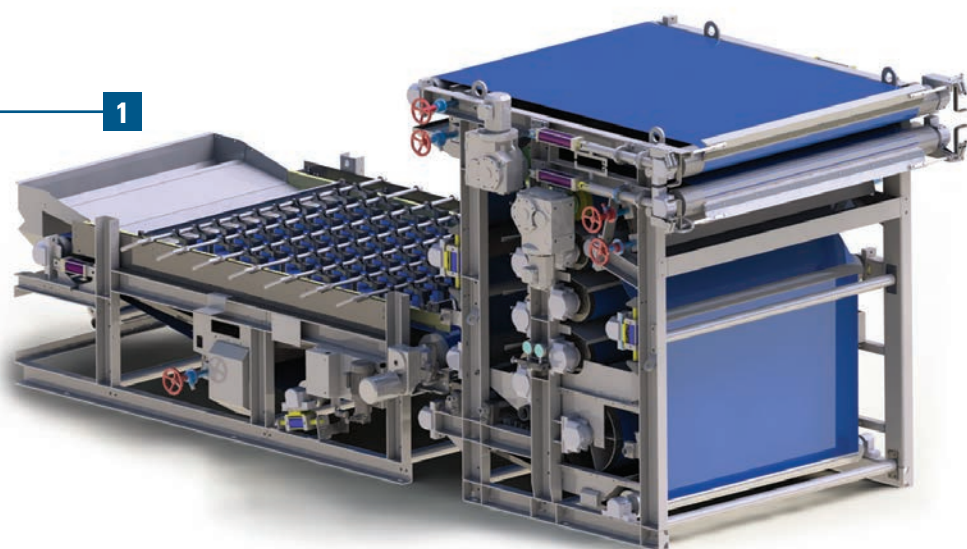
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Desrosiers’ proudest moment was when the commission received a U.S. EPA National Excellence Award for having the best-operated and maintained large secondary wastewater treatment plant in the country.





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More Control, Drier Cake

A NEW BELT PRESS COMBINES INNOVATIONS IN MECHANICAL OPERATION AND BELT DESIGN TO PROVIDE AN EFFICIENT AND FLEXIBLE DEWATERING SOLUTION

By Ted J. Rulseh

Effective dewatering is important to biosolids management. Drier cake reduces volume and helps cut the cost of hauling to a land application site or landfill.

But dewatering can be tricky because wastewater treatment facilities face changeable influent and biosolids characteristics that can change over time and even day to day.

Now press manufacturer Alfa Laval and process belt producer GKD have combined to develop a belt press that's designed to give operators more control over dewatering and enable them to produce drier material, or significantly increase throughput.

The Alfa Laval AS-H Belt Press KPZ combines proven press technology with GKD belt weaving technology to create a press that is low-maintenance, long-lasting, flexible and easily upgraded as facility needs change.

It's designed to be suitable for municipal facilities and for several industrial applications. It is available in a wide size range and with modular options to meet specific requirements. Ken Medlin, managing director-Ashbrook Simon-Hartley with Alfa Laval, and Linden Swann, technical sales manager for process belts with GKD-USA, talked about the technology in an interview with *Treatment Plant Operator*.

tpo: How would you describe the working relationship between Alfa Laval and GKD?

Swann: The 20-year partnership between GKD and Alfa Laval makes the system whole. GKD supplies woven synthetic mesh to Alfa Laval, which designed the KPZ press.

tpo: What would you say is the most essential benefit of this new design?

Medlin: We've created a press that allows for variability in the process. Our machine can change and move depending on biosolids characteristics. So we have variability from a mechanical standpoint, and we also have variability with the belt weave. They are separate pieces, but together allow for the most control over the dewatering process.

“We've created a press that allows for variability in the process. Our machine can change and move depending on biosolids characteristics.”

KEN MEDLIN

tpo: What in particular provides the flexibility operators need?

Medlin: The control comes from speed of the belts. One is the gravity section, and the other is through the pressure section on the tower. Operators can run those at different speeds; they have the ability to control the belt speeds independently. And we have a variable tension system. We also have a wedge plate that can be adjusted to ensure proper entry into the pressure section. In addition, the chicanes are all independently operated.

tpo: How does the belt design contribute to operating flexibility?

Swann: We have a number of mesh designs that can range from 50-micron

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to 3,000-micron woven synthetic mesh. Based on the process and the biosolids characteristics, we can alter our mesh specification to provide the most suitable belt. We offer a standard product that is suited for the majority of applications, but we also provide solutions for challenging conditions.

tpo: What level of solids content can this press achieve?

Medlin: We can produce dry cake at 21-24% solids. With a typical waste activated sludge, we can typically get 2-3% higher solids content than a traditional belt press. But beyond that, we can accommodate a higher hydraulic loading of solids. The throughput is about one-third higher than with any of our other belt presses.

tpo: What needs in the market drove development of this belt press?

Medlin: Market drivers around removal of phosphorus and other components of sludge are affecting things like the addition of polymer. We wanted to give operators as much flexibility as possible to deal with the conditions they face. We provide that flexibility through our tension rollers and our hydraulic process, or we can use our adjustable wedge plate, which allows them to even and thin the material as it goes into the pressure section. Our Dri-Boost Plow enables to increase throughput or increase cake solids.

tpo: How does the Dri-Boost Plow function?

Medlin: The normal belt press chicane is a wedge or a panel that sits on the belt and it moves the material back and forth across the belt so that the water can drain. The Dri-Boost Plow has an arrow/spear profile. It's a wide device sitting on the belt, so it creates a wider area on the belt for the water to drain. In addition to this, it turns the material over, so we get a drier cake at the end of the gravity deck.

tpo: What are some of the unique features of the belts?

Swann: It has a low-profile seam. There is no transition; it's virtually

“Based on the process and the biosolids characteristics, we can alter our mesh specification to provide the most suitable belt.”

LINDEN SWANN

the same thickness as the belt. This allows the chicanes and the scraper blades to pass smoothly over the seam area, which is typically the fail point of a belt. There is also a wear indicator. Our belts are blue, but the core of the monofilament polyester is white. So as the belt wears during the process, the white starts to come through. That indicates the need to change out the belt very soon.

tpo: What makes this press easy to maintain?

Medlin: The gravity deck is where about 80% of belt press maintenance is done. With our low profile, there is no need for scaffolding or other structures to provide access to the deck area. In addition, a wash box continuously washes the belts to clean the polymer and excess material. This keeps the belts clean and allows for optimal operation without oversight. **tpo**



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All in for Recycling

FLORIDA'S LAW LOOKING TO ELIMINATE SURFACE DISCHARGES OF WASTEWATER EFFLUENT PUTS THE STATE AT THE FOREFRONT OF PROMOTING BENEFICIAL REUSE

By Ted J. Rulseh

Last August, national news reported a historic low water level in Lake Mead, the source of water for much of the Southwest.

As a result, the U.S. Bureau of Reclamation announced the first-ever water shortage for the lower Colorado River; water release reductions to Arizona, Nevada and northern Mexico were announced for 2022 to make sure the lake contains enough water to continue electric power generation and supply water for essential uses.

Along with extreme drought in the West, it's another symptom of change in water supplies. Meanwhile, on the other side of the nation, Florida has taken aggressive measures to help ensure reliable water supplies by passing a law that would all but eliminate discharges of wastewater effluent to surface waters.

Under the law, wastewater utilities had until Nov. 1 to submit plans to eliminate "nonbeneficial surface water discharge" by 2032. There are limited exceptions, such as for discharges related to indirect potable reuse projects, wet-weather discharges and reuse systems that recycle at least 90% of annual average wastewater flow.

The WateReuse Association is dedicated to advancing laws, policy, funding and public acceptance of recycled water. Patricia Sinicropi, executive director, and Robert Beltran, president of WateReuse Florida, talked about the state's law and larger trends toward water recycling in an interview with *Treatment Plant Operator*.

tpo: Given that most people don't look at Florida as a water-scarce state, what drove the adoption of this law?

Sinicropi: Florida has been discussing this approach for several years. The state has several challenges related to water and water supply. Of course they have a coastline that they are interested in protecting. They have very shallow groundwater, and they are draining their aquifers at a rapid rate.

Sea level rise is putting pressure on the coastal aquifers, and they're experiencing saltwater intrusion in several areas due to over-pumping of groundwater resources. With population growth, the state expects to need an additional one billion gallons of water per day by 2040. Florida has also struggled mightily with nutrient issues, not only in the ocean waters but on inland lakes. All of those factors combined to lead the state aggressively down the path of expanding an already robust water reuse program.

Beltran: In 2010, reuse was not included by water management districts as a source of drinking water. Through the effort of utilities, we were able to educate regulators and legislators about the importance of reuse as

an option for drinking water. Since that time the districts and Department of Environmental Protection have assisted with funding and time to support reuse.



Patricia Sinicropi

tpo: Why was this an opportune time for the state to take this action?

Sinicropi: Water recycling technology has improved to the point where we now have the ability to treat virtually any source of water to a quality appropriate for any purpose. In fact, the Florida Department of Environmental Protection is developing rules for potable reuse, thanks to the advocacy work of the Florida Potable Reuse Commission, chaired by WateReuse Florida.

Some communities will decide that the most efficient way to reduce surface water discharges of effluent is to treat the water to meet drinking water standards. In Florida and elsewhere, we've had more than three decades of experience with safe and beneficial water reuse. Given that the technology works, is affordable, and can help the state meet its water supply needs, Florida was able to consider what it means to eliminate discharges to surface waters and to ocean outfalls.

tpo: What were some of the challenges to adoption of this law?

Beltran: The science has been there to treat reuse to drinking water requirements. The "yuck factor" has been a hurdle, but studies have found

“In Florida and elsewhere, we've had more than three decades of experience with safe and beneficial water reuse.”

PATRICIA SINICROPI

that this can be overcome through education. The One Water Florida initiative, supported by WateReuse Florida, is an example of efforts to highlight the benefits of recycled water and how it will safely supply Florida's future.

tpo: What will be involved for communities and clean-water utilities to make the transition to beneficial reuse?

Sinicropi: Florida has a lot of purple pipe already, but for many communities it's going to require significant planning. Many are already preparing for the transition. For example, Jacksonville, Hillsborough County, Altamonte Springs and Tampa are already moving pretty aggressively toward potable reuse programs. For the most part it is indirect potable reuse by way of aquifer recharge. A lot of investment will be needed to realize those plans.

tpo: Looking at the bigger picture, do you see other states moving in this direction?

Sinicropi: We're seeing a similar push in California, where they now have a study bill to examine whether they could adopt a similar policy in the future, I don't think we'll see this approach in many other states, but in Florida, which has a long history of water reuse, it is a viable strategy.

tpo: How do you see western and southwestern states dealing with drought conditions taking action on water recycling?

Sinicropi: I think we'll see more and more water reuse; whether the legislatures in those states will implement mandatory recycling, I don't know. It involves a great deal of policy and political discussion. I do know that water managers in those states are developing plans that call for significant recycling in the future. There are over 300 new water recycling projects in various stages of planning in that region.

tpo: Can you cite any specific examples?

Sinicropi: Los Angeles has declared that it will move to 100% water recycling by 2035. The Metropolitan Water District, a wholesale supplier of water to 26 water agencies in southern California, is going all in for water recycling in the future. States like Arizona and New Mexico are very strongly moving in the direction of full water reuse. Utah, Nevada and other states are already undertaking significant recycled water programs.

tpo: How do you see wastewater utilities in Florida responding to and ramping up to comply with the new law?

Beltran: First, they will pilot test different treatment options and start public education. The treatment scheme must include safeguards to ensure that quality is not compromised at any time. One model to follow is San Diego, which did a great job of turning public opinion with its education program. Other utilities are following that lead to increase public awareness of the benefits to the environment and build support for a sustainable water supply.

tpo: What is the role of the WateReuse association in helping these plans move forward?

Sinicropi: One of our primary roles is making sure there is sufficient federal and state investment in reuse. In fact, the bipartisan infrastructure package before the U.S. Congress includes \$1 billion for such investments through the Bureau of Reclamation. We're working very hard to secure funding for a nationwide water recycling program because we believe many communities east of the Mississippi will eventually face questions similar to those Florida is addressing. We're working to get a nationwide grant program set up and funded.

tpo: How does that advocacy play out at the state level?

Sinicropi: Our state sections are working with their legislatures to make sure money is set aside in state budgets to help communities move toward recycling.

tpo: How does your association support recycling at the level of policy?

Sinicropi: Our role includes making sure the rules in place at the federal and state levels facilitate the adoption of reuse programs, or at least don't present barriers to communities that want to move in that direction. We also provide informational tools and resources. Our website offers a number of communication tools to help the public, educators and policymakers learn about the safety and benefits of recycled water. We play a number of roles in supporting the policies and providing the public education tools needed to make reuse programs succeed.

tpo: How is the association active in the technology sector?

Sinicropi: We're not a research association in terms of investing in technologies, but we do have several technology providers at the table discussing best management practices and sharing information on innovative

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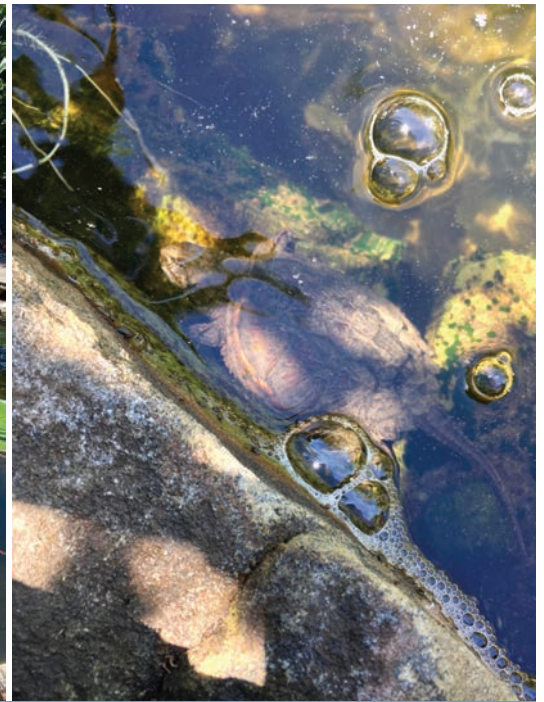
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technologies coming onto the market that can improve efficiency and treatment quality in recycled water programs. We provide a forum for technology providers and people interested in innovation to share their experiences with our membership.

tpo: Will we see a time when water recycling, rather than effluent discharge, is the default position for clean-water utilities?

Sinicropi: The water world is going to look very different in 50 years. We're seeing the evolution take place. The more people grow comfortable with water reuse, and the more they understand how technology can produce recycled water that is safe for both potable and nonpotable uses, the more communities everywhere will think differently about discharging effluent into water bodies that may not be the best receptacles for it. What we call "wastewater" is not waste at all; it's a resource that can be treated and used over and over again for a variety of beneficial purposes. **tpo**



Creating an Attraction

A WATERFALL, POND AND LANDSCAPING HELP TURN A PENNSYLVANIA CITY'S CLEAN-WATER PLANT INTO A VISUAL ASSET AND A SOURCE OF OPERATORS' PRIDE

By Jeff Smith

A waterfall near the entrance to the Easton (Pennsylvania) Wastewater Treatment Plant is the first thing people see when passing the plant on a busy two-lane highway. When they look closer, it appears that the source of the water is overflow from a plant structure. The slope of clarifier one directly faces the road and was an excellent location for a water fall pond water feature.

"Clarifier No. 1 faces the very heavily traveled Highway PA 611, so we constructed the waterfall to look like it was part of the structure," says Chuck Wilson, plant operations manager.

15-FOOT FALL

Falling from nearly 15 feet above ground, the overflow cascades over decorative rocks and empties into a 6-foot-diameter EPDM-lined pond below. A submerged Complete Aquatics 10,000-gallon pump circulates potable water through a 3-inch-diameter PVC pipe back to the spillway.

The waterfall follows the slope of an existing earthen slope from the top of the clarifier to pond level. A 3-foot-wide strip of crushed white stone retains the cascading waterfall on both sides. An additional 5-foot-wide strip of larger dark-toned stone borders the white stone and highlights the waterfall as a focal point of the scene. Approximately 2 tons of stone and additional landscaping material were used during the construction.

The clarifier's location relative to the road and the natural incline of the surrounding earth provided an excellent spot for the waterfall and pond. Nearly two tons of decorative stone and additional landscape material was used to construct the water feature.

PROJECT REBORN

The motivated was desire to present the plant as a visual asset to the community. Wilson says the idea the waterfall was proposed by his prede-

cessor nearly 10 years ago. A professional landscape designer had submitted a design, but budget constraints derailed the project.

"I was the assistant superintendent at the time, and we were all pretty disappointed," Wilson says. In 2017, Jack Keiter transferred to the plant from the parks department. With his hardscaping and landscaping knowledge, with help from operator Butch Kugler, the waterfall was built in 2019.

The plant is just under 10 acres. Directly across Highway 611 is the Delaware Canal. A wooden footbridge is also maintained by the state park system, crossing the Delaware canal and leading to a public walking trail that parallels the river. The facility discharges into the Delaware River immediately downstream from the footbridge.

“Originally, the pond was stocked with koi fish, but with our proximity to the Delaware River, we believe herons may have eaten the fish.”

CHUCK WILSON

TEAM EFFORT

Keiter led a team from the facility in planting and maintaining honeysuckles along the chain-link fence that borders the plant near its entrance. "They all do a wonderful job of keeping the place looking nice," Wilson says.

In recognition of his efforts to beautify the plant, Keiter received the 2020 Outstanding Employee Award presented by the Eastern Pennsylvania Water Pollution Control Operators Association. "Originally, the pond was stocked with koi fish, but with our proximity to the Delaware River, we

believe herons may have eaten the fish,” says Wilson. “We intend to restock it someday.”

Today, a few turtles and some frogs populate the pond, which supports lily pads and cattails. Light-sensor-controlled LED lights nestled in the flora illuminate the waterfall at night. Says Wilson, “The waterfall and pond have become a nice attraction and a conversation piece for our facility.” **tpo**



The team at the Easton Treatment Plant includes, from left, Butch Kulger, Jack Keiter, Chuck Wilson (plant operations manager), and Alex Hoffman.

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people/awards

The **City of Sequim Water Reclamation Facility** recently received a 2020 Wastewater Treatment Plant Outstanding Performance Award from the Washington Department of Ecology.

The **City of Palm Coast Wastewater Treatment Plant #2** received a Florida Water Environment Association Class B Third Place Award for 2021.

The **Bay View Treatment Plant** in Toledo, Ohio, won a 2020 Gold Peak Performance Award from the National Association of Clean Water Agencies.

Bryan Clor, head of Wastewater Treatment Division in Warren, received the Donald. M. Pierce Award from the Michigan Water Environment Association for producing good effluent from a clean and orderly plant while interacting with operators for the betterment of the profession.

The **Walnut Creek** and **South Austin Regional Wastewater Treatment Plants** in Austin, Texas, received 2020 Gold Peak Performance awards from the National Association of Clean Water Agencies.

The **Aqua Pennsylvania** wastewater treatment plant in Upper Providence Township, Delaware County, received the Phase III Directors Award from the Partnership for Clean Water.

Don Bessler was named director of engineering services for Glendale, Arizona.

The **City of Vicksburg**, Mississippi, received the 2021 Water Treatment Plant of the Year award for a third year in a row from the AWWA.

The **Jonathan Rogers Water Treatment Plant** and **Robertson/Umbenhauer Water Treatment Plant** in El Paso, Texas, received the 15-Year Directors Award in 2020 from the Partnership for Safe Water.

TPO welcomes your contributions to Worth Noting. Email editor@tpomag.com. **tpo**

events

Nov. 3-4

AWWA OpShow – Practical Ideas of Water and Wastewater Operations, online. Visit www.awwa.org

Nov. 2-5

Nebraska Water Environment Association Joint Fall Conference, Younes Conference, Center, Kearney. Visit www.nebwea.org

Nov. 7-9

Water Environment Association of Ontario Technical Symposium and OPCEA Exhibition, RBS Place, London. Visit www.weao.org

Nov. 7-10

AWWA 2021 Water Quality and Technology Conference, Greater Tacoma (Washington) Convention Center. Visit www.awwa.org

Nov. 17

AWWA Performance Criteria for Source Water Protection Webinar. Visit www.awwa.org

Nov. 28-Dec. 2

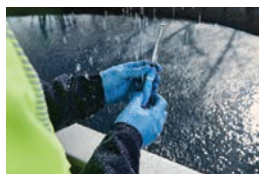
2021 Florida AWWA Section Annual Conference, Hyatt Regency Grand Cypress, Orlando. Visit www.fsawwa.org



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product spotlight

wastewater

Feed pump helps standardize operations

By Craig Mandli

Water treatment is technology-driven and heavily regulated. But that doesn't mean every part needs to be complicated or overly costly.

For wastewater plants requiring metering pumps to dose treatment chemicals for processes such as disinfection, filtration, clarification, coagulation and flocculation, **Blue-White** offers a solution that allows operators to standardize operations with one chemical feed solution — the **FLEXFLO M1 Peristaltic Dosing Pump**. The self-priming M1 delivers smooth, consistent and precise chemical dosing with no danger of vapor lock or loss of prime. It's an answer to an industry need, according to Patrick Murphy, the company's director of engineering.

"The M1 started when we realized that a lot of municipalities would use our A-100N for their needs. This pump was originally meant for the industrial space instead of municipal," says Murphy. "We then reached out and listened to our customers for feedback on what they would want from our pump. This included NEMA 4X rating, relay alarms, remote/stop capabilities, NSF 61 rating and LCD cover to protect from chemical residue. We also took what we learned from our motor development projects to incorporate our energy efficient brushless DC motor as well. This gave us the power we required while requiring less energy to drive the pump."

The pump has 4-20mA SCADA inputs and offers a feed output range of .0001 to 5.6 gph, pressures to



FLEXFLO M1 Peristaltic Dosing Pump from Blue-White

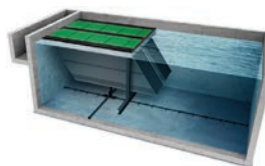
100 psi and a high energy efficiency rating. The pump achieves a 10,000-to-1 turndown ratio and is powered by efficient BLDC motor technology. According to Murphy, the pump is typically utilized at smaller municipalities or small well sites. It fits across multiple applications because it has different tubes that make it versatile enough to work typical water treatment chemicals, polymers and harsh chemicals.

"It is a simple-to-operate pump with a turndown ratio that simplifies the ordering and models of the pump because one tube will have a wide range of flow rates that it can operate in," says Murphy. "Gone are the days of having several different tube assemblies to cover all the ranges of flow rate requirements."

A sealed enclosure and a display shield protect the pump's easy to operate controls from chemical spills and splashes. In addition, the enhanced Tube Failure Detection System (TFD+) senses tube rupture with no false triggering.

714-893-8529; www.blue-white.com

to a digital signal and transfers it inductively to the transmitter, offering safe data transfer for increased availability of the measuring point and trouble-free operation. Memosens 2.0 sensors store numerous relevant data points, such as operating hours, minimum and maximum temperatures, measured values, calibration histories and load matrices. All this data can be used and processed for comprehensive analysis and more precise process management. The sensors also provide a sound basis for predictive maintenance strategies when used in conjunction with Endress+Hauser's Heartbeat Technology, along with enhanced IIoT services via the Netilion ecosystem. **888-363-7377; www.us.endress.com**



Xylem Leopold Texler lamella clarifier

Xylem's Leopold Texler lamella clarifier supports the efficient removal of solids in water treatment applications. The clarifier's lamellas are made from a recyclable, hydrophobic geotextile material — a durable, high-density polyethylene — which reduces service and maintenance requirements while cutting solids by more than 80%. The flexible design allows for cost-effective retrofitting by using existing rectangular basins,

which reduces the overall construction costs while increasing the flow capacity. The clarifier comes with a UV cover to prevent algae growth and protect against debris entering the clarifier. Unlike steel plates, the system's HDPE is 100% corrosion free. **855-995-4261; www.xylem.com**



Torrey Pines Scientific Model HS70 digital stirring hot plates

Torrey Pines Scientific Echo-

product spotlight

water

Level transmitter designed for tight-quarters operation

By Craig Mandli

Not having the right tool for the job can be a major detriment. Level transmitters can sometimes be too large for the area they need to be used in. But at only 0.63 inches in diameter, the **Microlevel** from **KELLER America** is a fully media-isolated level transmitter built to easily install into 3/4-inch Schedule 40 pipes.

“Considering the high failure rate of other small-diameter instruments, many users were left with little recourse,” says John Wadley, marketing manager for KELLER America. “There simply wasn’t a submersible level transmitter that could fit within the same installation site and survive deployment where the other products had already failed. The Microlevel does.”

The Microlevel is media-isolated, meaning that the actual sensor will never come into contact with the water. This is significant because previous small-diameter transmitters only achieve temporary media isolation by covering the sensor with lithium or dielectric grease, which can only work until the grease dissipates, leaving the sensor directly exposed and therefore soon to fail, according to Wadley.

“We have used feedback to improve the Microlevel’s utility, including increasing pressure ranges for deeper wells, titanium construction for wells facing infiltration of saltwater, and drinking water certifications to ensure safe use in municipal water systems,” says Wadley.

The Microlevel, like all other KELLER submersibles, operates by measuring the hydrostatic pressure of the water. As such, it can be used in any standard liquid level measurement application. It is most often

used in groundwater applications, especially those with narrow casings. With the new inclusion of titanium construction, the Microlevel is now capable of deployment in chemical or saltwater level measurement as well. According to Wadley, the product’s development was simply the next evolution of proven technology.

“For development, the short answer is that there wasn’t much in the way of research necessary. KELLER already manufactures small-diameter pressure transducers and already utilizes high-accuracy microprocessor-based conditioning electronics,” he says. “All that was needed was an application that required putting those two core KELLER competencies together. And while the development of an appropriately sensitive and accurate sensor brought challenges of its own, the real feat is the electronics, ... recreating the compensation electronics in a form factor that could fit within the narrow housing while still incorporating our lightning protection. We feel we’ve been successful in both endeavors.”

877-253-5537; www.kelleramerica.com



Microlevel from KELLER America

Therm Model HS70 digital stirring hot plates are designed with a purge port for infusing an inert gas, such as lab air, into the chassis of the unit. This positive pressure inside the chassis causes the gas to flow out of any openings and prevents corrosive gasses from entering the chassis, greatly improving unit life. In manual operation, select the parameter to be set and scroll to the value needed. In the programmable mode, routines can be stored for instant recall and use. The stored routine will run automatically, without attention, at exactly the same time after time. Multiple temperatures, temperature ramp rates, stirring speeds and timed events can be stored.

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product for bulk storage in mining, minerals, chemicals, power, paper, food and beverage industries. The radar offers several advanced technological features, including an 80 GHz bandwidth radar and a 2.75-inch lens antenna, making it ideal for environments with low-reflective media. With a measuring range extending over 328 feet, the Opti-

wave 6500C is a great choice for uneven surfaces or tanks with obstacles. Other features include PEEK lens antennas with both concave and convex lenses for distances up to 328 feet and a large backlit LCD screen with a 4-button keypad.

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By Craig Mandli

Ozone and oxygen reduce odor at collection system and lift station

Problem

A Pacific Northwest regional wastewater authority received multiple odor complaints especially during summer. Hydrogen sulfide levels ranged from 75 to 250 ppm.

Solution

After a demonstration from **Anue Water Technologies**, the authority chose a **Phantom oxygen/ozone injection system** with two HydroSpear conditioning heads in the wet well at the lift station. Pre-demonstration data had shown odors caused by aqueous and vapor-phase sulfides and elevated mercaptan levels.



RESULT:

Soon after the demonstration began, odors at the lift station vanished and complaints ceased. Hydrogen sulfide levels dropped immediately to single-digits and remained at less than 10 ppm. The decreased odor also reduced blower runtime, saving \$2,000 to \$3,000 per month. **760-727-2683; www.anuewater.com**

Plant saves taxpayer money with peroxyacetic acid

Problem

In 2015, the New Jersey Department of Environmental Protection restricted the release of chlorine residuals to limit disinfection byproducts. The 3.1 mgd Berkeley Heights Wastewater Treatment Plant needed to replace their disinfection method, find an alternative to sodium hypochlorite/sodium bisulfate and meet the DEP's permit levels.

Solution

The plant chose peroxyacetic acid treatment and used **SaniDate 15.0 (BioSafe Systems)** for disinfection. Dosing 1.5 mg/L after the sand filters proved effective. Average fecal coliforms were reduced from 229 to 41, and average *E. coli* from 150 to 18, well under the limits. The PAA dosing system was implemented quickly, and PAA doesn't risk creating DBPs. It showed stronger oxidizing potential than chlorine, used shorter contact time, and certified degradation of problem chemicals. The facility reduced operating costs by 12% and avoided a million-dollar UV installation with a \$50,000 annual maintenance cost.



RESULT:

Berkeley Heights has been successfully using SaniDate 15.0 for disinfection since 2017. **888-273-3088 www.biosafesystems.com**

Facility find success in phosphorus removal process

Problem

The Drake Water Reclamation Facility in Fort Collins, Colorado, needed phosphorus removal to meet new regulations from the state Department of Public Health & Environment.

Solution

The facility chose **MagPrex** from **Centrisys/CNP** for the lowest life cycle cost after Carollo engineers evaluated all available phosphorus removal technologies.



RESULT:

Since 2020, the facility has achieved effluent phosphorus below 0.5 mg/L. The reactor reliably removes more than 90% of orthophosphate from the phosphorus recycle loop going back to the front of the plant, enabling the facility to consistently meet the lower phosphorus limits. Carollo, Fort Collins and Hydro Construction completed the project in 18 months. **262-747-2384; www.centrisys-cnp.com**

Package treatment plant enables expansion and reduces maintenance at RV park

Problem

The Yogi Bear's Jellystone Park full-service campground in Waller, Texas, had expanded its sewage treatment system many times, and it was again at capacity, restricting park expansion and requiring costly maintenance. An engineer was asked to design a new system with 30,000 gpd capacity to meet state permit requirements.

Solution

The campground team chose a **package treatment Plant (Delta Treatment Systems)** using an extended aeration and oxidation process. It yields clear and odor-free effluent that meets permit requirements. The custom plant was installed on an engineered, reinforced concrete structural slab. It has dual aeration basins, sludge holding tanks, blowers and pumps, and a 10-foot-diameter mechanical clarifier with skimmers and a clarifier bridge. A separate pump tank was incorporated into the design.



RESULT:

The plant was built at the factory and shipped to the site as a self-contained unit and required little assembly. It continues to perform as expected. **800-219-9183; www.deltatreatment.com**



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Self-cleaning filters utilized in treatment and reuse of stormwater

Problem

The City of Los Angeles needed on-site treatment and beneficial reuse of retained stormwater to irrigate of Temescal Canyon Park. The project included a 120-foot stormwater line with a 500 gpm pump inside an existing buried reservoir to the treatment building.

Solution

Forsta Filters worked with a local contractor to provide a 200-micron self-cleaning filter. The **B6-180 model self-cleaning filter** handles the maximum flow for the Temescal pump station system. The filter protects drip tubing and irrigation spray nozzles from debris buildup. Clogged nozzles can lead to damage to turf and landscape, which requires time-consuming and costly replacement.



RESULT:

Forsta engineers conducted comprehensive training at the Temescal Canyon site. The equipment installed has reliably provided filtered water for irrigation. 888-936-7782; www.forstafilters.com

Blower specified for SBR system

Problem

A plant in the Pacific Northwest had issues with blower reliability on a sequencing batch reactor due to frequent starts and stops. The plant team wanted a high-efficiency blower, but it had to be able to start and stop every 20 to 30 minutes.

Solution

The plant chose the **Inovair IM-30 Geared Centrifugal Blower** (Stacked). To avoid unnecessary wear, Inovair engineers designed the gearbox with unlimited-life non-contact floating ring oil-film journal bearings and tapered land thrust bearings. These bearings have been used for decades in the turbo-machinery market and operate on the same basic principles as crankshaft bearings in cars.



RESULT:

After a year and thousands of starts/stops, the blower worked flawlessly. The plant team is experiencing improved reliability and lower operating costs. 855-466-8247; www.inovair.com

(continued)

Injector system helps plant make switch to UV disinfection

Problem

The Hagerstown (Maryland) Wastewater Treatment converted to UV from ozone for disinfection. With ozone system, the effluent dissolved oxygen met regulatory standards. With UV, the regulatory agency was concerned about lower DO discharges. (Due to a denitrification step upstream, the effluent naturally has zero DO.)

Solution

Since the compressors and oxygen concentrators in the old system still worked, they were used to feed oxygen to reach their effluent DO goal (as high as 8 mg/l). A pure oxygen injection system was purchased including a booster pump, a 4-inch **stainless steel injector** from **Mazzei Injector**, a pipeline flash reactor (PFR), and two oxygen control and instrumentation manifolds. A fraction of the mainline flow is taken off the effluent pipeline, directed through a booster pump and then through an injector to aspirate pure oxygen. The oxygenated sidestream is then mixed back into the 36-inch effluent pipeline through an inline PFR. This eliminates the need for an additional tank/basin and drastically reduces the energy consumption and footprint.



RESULT:

Since startup of the injection system, mainline flows have varied from 3.5 to 30 mgd with an average plant flow rate of 6.5 mgd. The system has successfully increased the effluent DO levels, exceeding discharge requirements under all conditions with minimum maintenance and low operator involvement. **661-363-6500; www.mazzei.net**

Chloramine management system keeps disinfection consistent

Problem

The Colony on the east shore of Lake Lewisville north of Dallas, Texas, occupies 2,500 acres and has seen its population almost triple in 15 years to 45,000. A persistent area of low disinfectant residual was under the influence of one of four elevated storage tanks, with a 1 million-gallon capacity. Lower turnover periods saw chloramine disinfectant residuals in the tank plunge, requiring flushing and even taking the tank offline. The periodic testing and manual intervention was costly and disruptive.

Solution

The Colony staff chose the **Monoclor RCS chloramine management system** from **PSI Water Technologies, a UGSI Solutions Company**. The system automatically generates a constant and reliable chloramine residual in the reservoir by creating a homogeneous mixture, introducing ammonia and chlorine rationally and monitoring the equilibrium with control logic in real time. The system automatically manages the chloramine breakpoint chemistry to ensure that regardless of conditions the tank effluent always has the appropriate disinfectant residual.



RESULT:

Once the system was installed, the pressure zones had far fewer taste and odor complaints. "The Monoclor RCS system successfully managed our chloramine disinfectant residual through all seasons and played a big part in improving water quality in the downstream pressure zones," says Jimmy Arthur, water production supervisor. **888-774-4536; www.ugsicorp.com**

Water reclamation facility upgrades nutrient recovery system

Problem

The Tres Rios Water Reclamation Facility in Pima County, Arizona, had battled struvite buildup in pipelines and equipment after anaerobic digestion for many years. A combination of ferric chloride downstream of the digesters and dilution water in the centrate return lines slowed struvite buildup, but performance had to be improved.

Solution

The facility staff aimed to stop struvite scaling issues, eliminate ferric chloride and dilution water addition and reduce phosphorus return loading to the plant. This led to a project to treat digestate and remove phosphorus by sequestering the produced struvite within the biosolids. The **NuReSys Struvite Management System** from **Schwing Bioset** was selected to precipitate struvite in the digestate stream for removal with the biosolids.



RESULT:

The system treats digestate flow following the digesters. The precipitated struvite then becomes entrained in the biosolids and exits the plant with the dewatered cake. The system is exceeding performance metrics and is on pace to save the county hundreds of thousands of dollars annually on maintenance. **715-247-3433; www.schwingbioset.com tpo**

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Treatment, Filtration and Stormwater

By Craig Mandli

Aeration Equipment

BROWN BEAR SERIES R31

Brown Bear R31 series paddle aerator attachments for sludge drying and aeration of compost windrows attach to high-flow skid steers and high-flow compact track loaders. They are designed to be used with flows of up to 50 gpm and pressures up to 5,500 psi. The aerator can be used for accelerated drying of all types of potable water and wastewater sludges, hydrocarbon-petrochemical sludges, industrial and mining sludges and for aeration of compost windrows. The 31-inch-diameter aerator provides an economical mechanical solution for accelerated solar drying of sludges on pads and in drying beds, forming windrows, blending bulking agents or additives, pulverizing and aerating or water mixing for aerobic windrow composting. The rapid handling rate exposes all of the material to oxygen so noxious odors are minimized. Drive to the aerator rotor is through the high flow hydraulic system of the carrier. **641-322-4220; www.brownbearcorp.com**



Paddle aerator attachments from Brown Bear R31 series

LAKESIDE EQUIPMENT MAGNA ROTOR AERATOR

The Closed Loop Reactor process, a modified form of the extended aeration complete mix process, provides biological nutrient removal using nonproprietary designs. It produces removal efficiencies that meet and exceed those of advanced tertiary treatment processes. BNR configurations are available with in-basin designs for nitrification and denitrification, as well as external selector configuration for Bio-P and Total N Removal. Process monitoring and control systems can be provided to continuously monitor and adjust the operation of the biological reactors to optimize process performance and reduce power costs. A vital component of the CLR Process is the horizontal bladed rotor aerator. The Magna Rotor Aerator from Lakeside Equipment provides oxygen and mixing to the basin with reliable operation and high efficiency. **630-837-5640; www.lakeside-equipment.com**



Magna Rotor Aerator from Lakeside Equipment

Aerobic Treatment

BYO-GON PX-109

Byo-Gon PX-109 is a non-toxic, non-corrosive and 100% organic and biodegradable alkaloid compound used for eliminating grease, sewage odor and hydrogen sulfide from restaurant grease traps, lagoons and



Byo-Gon PX-109 septic system treatment

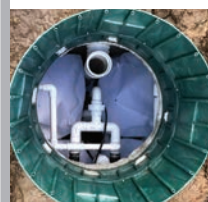
municipal sewage systems. As a stimulant to enzymatic activity at the cellular level, it promotes more rapid cell growth and consumption of organic material, overcoming limiting environmental factors to stabilize wastewater systems. Its use promotes healthy biological systems, preventing the need for large capital expenditures, as well as reducing costs. It is organically certified by OMRI. **888-296-4661; www.byogon.com**

PRODEX BAE

BAE (Biological Activity Enhancer) from Prodex is an organic liquid formula for use in aerobic and anaerobic environments to improve operational efficiency and maximize renewable energy production. As the green component to the engineered infrastructure, it provides plants with a low-cost biostimulant for existing microbes, increasing activity and populations to give the plant the best biology possible. Wastewater treatment plants can use it to boost biogas production, convert food waste to energy, help remove nitrogen, in maintenance dosage/emergency use, to reduce operational costs such as hauling, chemicals and energy, enhance plant operational efficiency and stability, improve solids handling and sludge settling, and accelerate recovery after plant upsets. By maximizing the microbial workforce, it helps the industry work towards cleaner water resources and a greener energy supply. **856-234-4540; www.prodexproducts.com**



BAE (Biological Activity Enhancer) from Prodex



SeptiTech STAAR filter systems

SEPTITECH STAAR

Designed for both multifamily domestic and high-strength commercial wastewater, SeptiTech STAAR (Smart Trickling Anaerobic/Aerobic Recirculation) filter systems range from 100 to more than 150,000 gpd treatment applications. The technology allows for simple, automatic and reliable equalization and clarification processes. The biological trickling filter technology also maintains low levels of Nitrate-N and achieves lower operating costs and power requirements with all below-grade components that fit readily in available concrete, plastic or fiberglass tanks. It is suitable in areas where large tracts of land are not available for land intensive wastewater treatment systems and may qualify for equivalent secondary discharge standards. Systems are appropriate for small-to-medium-sized communities to rapidly reduce soluble BOD₅ with efficient nitrification and denitrification for environmentally sensitive areas. They utilize partially submerged media to treat high organic loads with durable process elements and low power requirements. **207-333-6940; www.septitech.com**

Blowers

FPZ E SERIES E11-MS

The e Series e11-MS blower from FPZ is a drop-in replacement for the K11-MS and offers increased efficiency, lower discharge temperatures and a significant reduction in perceived noise. The impeller design was developed through sound quality studies and rapid prototyping. The resulting design has a targeted reduction of the most displeasing frequencies. It is mountable in any position and offers a maintenance-free operation. Options include anodized aluminum components for corrosion resistance and increased sealing. **262-268-0180; www.fpzusa.com**



e Series e11-MS blower from FPZ

HOWDEN ROOTS 827 DVJ

The Roots 827 DVJ dry-vacuum blower from Howden is a heavy-duty unit with integral ductile iron impellers. The casing headplates, gear cover and drive-end are gray iron. Carburized and ground spur timing gears are taper-mounted on the shaft and secured with a locknut, cylindrical roller bearings, splash lubrication on both ends and easy-to-read sight glasses for maintenance. The blower is capable of handling high inlet temperatures for rough applications. An efficient discharge jet plenum design allows cool atmospheric air to flow into the cylinder, so the blower continues to run under blank-off conditions. It comes in a compact, lightweight package and delivers more than 5,700 cfm in an 8-inch gear diameter frame, as well as 28 inches Hg. **800-557-6687; www.howdenroots.com**



Roots 827 DVJ dry-vacuum blower from Howden

KAESER COMPRESSORS CUSTOM ENGINEERED BLOWER SYSTEMS



Blower systems from Kaeser Compressor

Plants looking to expand their blower room or put the blowers in a separate building should consider custom engineered blower systems from Kaeser Compressors. These pre-built, enclosed blower systems reduce engineering and installation costs. The company will design, build and deliver a complete blower system in a permanent, weatherproof enclosure. This

is often faster and less expensive than traditional building design, permitting and construction (followed by blower installation). The custom engineered solutions can be built for lobe, screw or turbo blowers and are designed for reliability, easy service access and energy efficiency no matter what the installation limitations may be. They can be designed for any climate and ensure an optimal, temperature-controlled operating environment for blowers. All internal piping and electrical work is completed prior to delivery. On-site commissioning is just a matter of connecting to one main power supply, one process pipe and a communication cable if remote monitoring/control is desired. **866-516-6888; www.us.kaeser.com**

Filtration Systems

CALGON CARBON FILTRASORB SENTRY

FILTRASORB SENTRY activated carbon from Calgon Carbon can be used in a variety of liquid phase applications for the removal of dissolved organic compounds. Its 8x30 mesh size provides improved pressure drop performance while delivering adsorption capacity for PFAS, making it a suitable granular activated carbon for surface water treatment. It also removes other contaminants of emerging concern, such as 1,2,3- TCP, as well as legacy contaminants like taste and odor compounds, organic color, total organic carbon and DBPs. It is made from select grades of bituminous coal through a process known as re-agglomeration to produce a high activity, durable, granular product capable of withstanding the abrasion associated with repeated backwashing, hydraulic transport and reactivation for reuse. The raw coal is mined and subsequently manufactured into GAC in the United States to ensure the highest quality and consistency in the finished product. **800-422-7266; www.calgoncarbon.com**



FILTRASORB SENTRY activated carbon from Calgon Carbon

EVOQUA WATER TECHNOLOGIES FORTY-X DISC FILTER ARMOR SERIES

The Forty-X Disc Filter Armor Series from Evoqua Water Technologies is a high-rate filtration device that utilizes an integrated pre-screen and stainless steel panels that are designed to accommodate high solids loading capacities and greater hydraulic throughput. The woven optimum primary mesh filter panel utilizes 316L stainless steel threads to create a weave that improves solids collection and rejection, which makes this disc filter suitable for stormflow applications. The panel configuration includes a molded structural frame and pressure-assisted seal, allowing the panels to sustain and operate at a higher headloss and provide higher throughput when compared to other disc filter synthetic medias. The series combines the technology of outside-in and inside-out filtration into a single PLC controlled unit with influent water flowing through the prescreen (outside-in) into the disc filter panels (inside-out). This combination of two filtration technologies provides an effective option for challenging applications. **844-409-9492; www.evoqua.com**



Forty-X Disc Filter Armor Series from Evoqua Water Technologies



Super Gripnet from AGRU America

Geomembranes/Geosynthetics

AGRU AMERICA SUPER GRIPNET

For engineers designing with geomembrane liners where drainage and high interface friction are critical, Super Gripnet from AGRU America can be combined with a geotextile to create an integrated drainage system. It can be easily configured with a geotextile to offer a superior drainage and interface friction solution with significant logistics and installation cost reductions. When part of an integrated drainage system, machined upward-facing studs and bottom-facing asperities provide high flow rates, reliable drainage capacity, a high-friction surface, superior slope performance, up to 15% faster installation and substantial cost savings. It has been deployed as a solution in over 150 million square feet across North America, supporting landfill closures, containment facilities, oil and gas applications and mining reclamation. **800-373-2478; www.agruamerica.com**

Lagoon Products

AMERICAN PLEASURE PRODUCTS UTILITY SERVICE BARGE

The Utility Service Barge from American Pleasure Products can provide a safe working environment and improve confidence when working on the water. The 8-by-12-foot work platform has suitable stability and flotation from using two 23-inch-diameter 12-foot pontoons. This barge can be used for servicing wastewater treatment ponds and lagoons. It includes aluminum frame construction with stainless steel hardware. The deck is covered with a nonslip nickel-plate vinyl for stability and easy cleaning. A

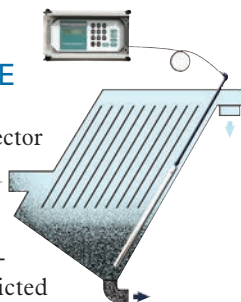


Utility Service Barge from American Pleasure Products

heavy-duty protective handrail is included. To maneuver the barge, a heavy-duty outboard motor mount is included for small gasoline or electric motors. It is available with a 1,000-pound-capacity lifting crane, one life ring and weld-on lifting eyes on each corner. **989-685-2697; www.aquacycleusa.com**

MARKLAND SPECIALTY ENGINEERING AUTOMATIC SLUDGE BLANKET LEVEL DETECTOR

The Automatic Sludge Blanket Level Detector from Markland Specialty Engineering uses high-intensity infrared light that, along with its slim profile, enables it to measure the sludge bed depth even in water and wastewater clarifiers and tanks that have obstructed or constricted areas, such as the inclined plates of lamellas. Beam intensity of the LED-phototransistor sensors automatically adjusts for thick or thin biosolids concentration or even light flocs. This detector allows operators to program desludge pumps to run only when necessary for maintaining the preferred liquid-solids interface level, saving wear and tear on pumps. It helps maximize water removal and optimize sludge feed density. In DAF units, it can adjust surface skimmer speeds to match variations in the thickness of the floating sludge layer. In SBRs, it can control the decant valve to minimize cycle times. Calibration is not required. **855-873-7791; www.sludgecontrols.com**



Automatic Sludge Blanket Level Detector from Markland Specialty Engineering



MBBR System Screens from Federal Screen

MBBRs

FEDERAL SCREEN MBBR SYSTEM SCREENS

MBBR System Screens from Federal Screen are used as a secondary treatment for a variety of municipal and industrial applications. They are designed to maximize flow rates as well as

to prevent biofilm carriers from escaping in wastewater treatment applications. Manufactured with high-quality stainless wedge wire, using wastewater screens reduces environmental pollution levels and lowers operational costs over the years. They are fabricated with strong and durable resistance welding and are available in a wide range of profile wire to suit most systems. They are robust for vertical wall applications and are self-cleaning when designed to the flow rate. Screens are available in a flat, curved or cylindrical form, and are manufactured to meet specifications. **905-677-4171; www.federalscreen.com**

MBRs

BIOMICROBICS BIOBARRIER MBR AND HSMBR

The complete, optimized design of the BioBarrier MBR and HSMBR systems from BioMicrobics simplify the settling, screening, direct aeration and ultrafiltration of the wastewater treatment process to remove 99.9% of the contaminants. Certified to NSF/ANSI 40 Class 1, NSF/ANSI 245 (nitrogen reduction) and NSF/ANSI 350 standards, these blackwater/graywater treatment systems establish the material, design, construction and per-



BioBarrier MBR and HSMBR systems from BioMicrobics

formance requirements for onsite residential and commercial applications. Installed above or below-grade, locally sourced tanks, the systems offer 500 to 100,000-plus gpd flows and meet water quality requirements for the reduction of chemical and microbiological contaminants for non-potable water use. The treated wastewater (i.e. high quality effluent) can be used for restricted indoor water use and/or unrestricted outdoor water use. **800-753-3278; www.biomicrobics.com**

SMITH & LOVELESS TITAN MBR

The TITAN MBR packaged membrane bioreactor system from Smith & Loveless includes high-performance flat sheet membranes, easy component access, intuitive graphical touch-screen PLC controls, smart advanced data monitoring and communications, reduced process complexity and a streamlined membrane clean-in-place process. It is designed with a stable process tailored to permit requirements and capable of achieving high effluent quality and Title 22 approved water reuse. It has stainless steel componentry and streamlined electrical layout with an operator-friendly wire management system. The treatment plant will arrive in a complete and compact factory-built system with significantly less field assembly for even swifter installation and startup. **800-898-9122; www.smithandloveless.com**



TITAN MBR membrane bioreactor system from Smith & Loveless



Mobile membrane bioreactor from SUEZ Water Technologies

SUEZ WATER TECHNOLOGIES MOBILE MEMBRANE BIOREACTOR

The mobile membrane bioreactor from SUEZ Water Technologies is a fully integrated wastewater treatment system incorporating biological processes and ZeeWeed 500 ultrafiltration membranes in a compact, ready-to-operate unit designed for direct reuse or discharge appli-

cations that require high-quality effluent. The unit is a self-contained system with modular connections for the process

unit and bioreactor. It has an integrated drum screen and aeration diffusers and is digitally enabled with the company's InSight asset performance management platform. The ultrafiltration membranes have a reinforced membrane fiber structure for durability. It is well suited for applications with variable influent quality and high levels of suspended solids. **866-439-2837; www.suezwatertechnologies.com**

Media Filters

ALFA LAVAL AS-H ISO-DISC

Alfa Laval AS-H Iso-Disc cloth media filters can be engineered to maximize the filtration area in an existing basin. They provide superior tertiary filtration that can meet California Title 22 reuse standards. The design enables individual disc turbidity to be measured and allows users to see the flow from each one and, if necessary, isolate an individual disc for maintenance without disrupting the rest of the flow. **866-253-2528; www.alfalaval.us**



AS-H Iso-Disc cloth media filters from Alfa Laval

AQUA-AEROBIC SYSTEMS AQUASTORM

The AquaStorm cloth media filtration system from Aqua-Aerobic Systems is an effective solution for wet-weather applications, including

combined sewer overflow, sanitary sewer overflow and stormwater. The system uses a disc configuration and OptiFiber PF-14 pile cloth media, and it operates with three zones of solids removal to filter wet-weather flows without the use of chemicals. It is designed to handle a wide range of flows in a fraction of the space and offers simple startup/shut-down with unattended operation for remote locations. The system also allows for dual-use application for tertiary and wet-weather operation. **800-940-5008; www.aqua-aerobic.com**



**AquaStorm filtration system
from Aqua-Aerobic Systems**

KRUGER USA ANOX K5 MEDIA

ANITA Mox is a sidestream deammonification technology that is offered in both MBBR and integrated fixed-film activated sludge configurations, depending on site conditions. As such, the system consists of engineered polyethylene carriers — Anox K5 Media from Kruger USA — to provide ample protected surface area for bio-film to thrive. The media (approximately the diameter of a quarter) hosts two types of bacteria in the same reactor. The outer layer consists primarily of ammonia oxidizing bacteria, which convert about half of the ammonia to nitrite. The inner layer consists mainly of anaerobic autotrophic ammonia oxidizer bacteria, which utilize the resulting nitrite and much of the remaining residual ammonia and convert them to nitrogen gas that is released harmlessly to the atmosphere. **919-677-8310; www.veoliawatertech.com**



**Anox K5 Media from
Kruger USA**

Mixers

JDV EQUIPMENT NOZZLE MIX SYSTEM

The Nozzle Mix System from JDV Equipment is a dual-zone mixing technology that provides uniform mixing patterns that produce even distribution and a stable environment. It can help optimize solids suspension and contact to promote efficiency in a wide range of applications. The system is designed with pumps installed outside the tanks to facilitate ease of maintenance. The pumps are typically chopper pumps or pumps incorporating in-line grinders that prevent fibrous materials from accumulating and causing plugging problems. The application dictates which type(s) of the many varied pump options can be used. The high-velocity nozzles are mounted inside the tank and are oriented to discharge in a flow pattern that completely mixes the tank contents. **973-366-6556; www.jdvequipment.com**



**Nozzle Mix System
from JDV Equipment**

PARK PROCESS VORTAFLO

The VortaFlo static mixer from Park Process combines two mixing nozzles of different sizes to create turbulence and induce mixing. The addition of the injection quill allows chemicals or polymer to be injected in the mixing zone past the turbulence-creating nozzle prior to passing through the mixing



**VortaFlo static mixer
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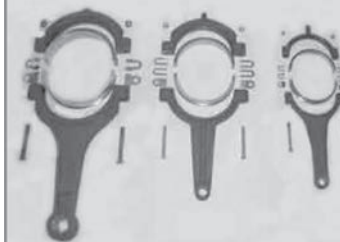
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nozzle. In the case of polymer flocculating biosolids, the turbulence nozzle causes the biosolids to roll in the mixing chamber so the polymer has maximum contact with biosolids particles prior to passing through the mixing nozzle, where flocculation is promoted. It is available in sizes ranging from a 1-inch inlet/outlet and 2-inch mixing chamber to a 12-inch inlet/outlet and 20-inch mixing chamber. **855-511-7275; www.parkprocess.com**

Nutrient Removal

AQUA-ZYME DISPOSAL SYSTEMS ADS

The ADS 30-yard open-top roll-off dewatering unit from Aqua-Zyme Disposal Systems can be filled with 22,000 to 25,000 gallons of biosolids at 1% to 2% solids in about two hours. After draining for 24 hours, the unit can be picked up using a standard-capacity roll-off truck and transported for solids disposal. Sludge volume can be reduced by 80% with reductions to 98% in BOD, COD, FOG and TSS. Effluent is clear, the unit has few moving parts, and the size of filter media can be selected according to job requirements. Standard equipment includes a roll-over tarp system; side, floor and center screens; 1/4-inch floor plate; 7-gauge side plates; four door-binder ratchets; eight drain ports; two inlet ports; and a long-handle scraper. Units are also available in a 15-yard size. **979-245-5656; www.aqua-zyme.com**



ADS dewatering unit from Aqua-Zyme Disposal Systems

DUPERON FLEXRAKE IQ

The Duperon FlexRake IQ platform provides real-time smart screening for maximum resilience at the headworks. It tackles high peaking factors due to extreme weather and difficult debris like flushable wipes, first flushes and settled solids. This is accomplished by system improvements and a sequence of operations that automatically responds in real time to optimize the screen field. The reimagined design focuses on smart enhancements to the raking device to manage heavy solids loading events with four times increased debris removal capacity, improved grit and rock handling and greater solids capture. During peak flow conditions, it adjusts the bar screen opening itself to provide additional hydraulic capacity and safety factor, matching the best capture rate to the flow volume in real time. **800-383-8479; www.duperon.com**



FlexRake IQ from Duperon



Xelletor series separators from Flottweg Separation Technology

FLOTTWEG SEPARATION TECHNOLOGY XELLETOR

Xelletor series separators from Flottweg Separation Technology include a rotor and scroll designed to reduce the consumption of polymer while also reducing energy consumption. Depending on biosolids quality, the centrifuge

can save about 20% on energy while providing significantly better performance. It can increase throughput by up to 15%, reduce the volume of biosolids by as much as 10% and save up to 20% in energy and polymer consumption. **859-448-2331; www.flottweg.com**

Ozonation Equipment/Systems

DE NORA WATER TECHNOLOGIES TETRA ABF

The TETRA ABF bioactive filter from De Nora Water Technologies combines the strong oxidation power of ozone with a biologically active filter to effectively remove micropollutants while reducing the formation of disinfection byproducts in drinking water and water reuse applications. Using a lower dose of ozone, it partially oxidizes carbon into smaller biodegradable organic compounds for removal in the downstream bioactive filter. By reducing ozone doses and using lower-capacity ozone equipment versus conventional ozone-only treatment, treatment plants may reduce capital costs and energy consumption. The advanced process does not require upstream RO or UF membranes commonly used with other types of direct and indirect water reuse schemes. **215-997-4000; www.denora.com**



TETRA ABF bioactive filter from De Nora Water Technologies

SBRs

PARKSON PISCES CFSBR

Parkson's PISCES CFSBR (Continuous Fill Sequencing Batch Reactor) combines the process benefits of cyclical treatment with the simplified operating concept of continuously filling all reactor tanks at all times. All required treatment steps occur within the reactors, eliminating the need for clarifiers and sludge recycle. Treatment is accomplished utilizing an aeration step followed by settle and decant. Treated effluent is removed from the upper portion of the basin by a DynaCanter floating, solids excluding decanter. The DynaCanter does not require any in-basin actuators or drive mechanisms to control the unit, making operation and maintenance convenient. The unit can be provided with several aeration types including VariOx jet aeration and fine or coarse bubble diffused aeration (fixed and retrievable). The cycle steps are dynamically adjusted utilizing Dyna-Phase Control software so that process performance and energy consumption are optimized during all flow conditions. **888-727-5766; www.parkson.com tpo**



PISCES CFSBR from Parkson

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The Q46S/66 prevents costly chemical overfeed by controlling the amount of chemical added for process dechlorination. Unique design prevents sensor fouling, which reduces system maintenance.

FEATURES

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- Cut Chemical Costs by Eliminating Costly Overfeeds



Total Chlorine Monitor



Reagent Free Measurement

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Dissolved Oxygen Monitor



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Optical Sensor with **Q-Blast**

FEATURES

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Sludge Blanket Monitor



Interface Level Analyzer

Continuous sludge level measurement supports effective process control.

FEATURES

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- Control blanket loss from over-pumping
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